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SCIENCE & TECHNOLOGY
EUROPE & LATIN AMERICA

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DENMARK: TOPSOE, RISO, DTH, ARHUS STUDY SUPERCONDUCTIVITY

Copenhagen BORSENS NYHEDSMAGASIN in Danish 14 May 87 pp 32-33

[Article by Niels Torben Volqvartz: "Topsoe Will Make Superconductors"]

[Text] In an old soap factory north of Copenhagen, Haldor Topsoe A/S has entered the race to develop superconducting materials. The firm hopes to be able to sink its teeth into the rapid development in the field.

There is a schnapps cooler on the coffee table between cups and cakes. But the contents are liquefied nitrogen at a temperature of minus 196 degrees Celsius. The cooler is in Schou's old soap factory near scenic Ravnholm north of Copenhagen, where the Danish-Italian-owned firm Haldor Topsoe A/S makes its home. The cooler is being used in experiments with so-called superconductors--materials which have the ability to conduct electric current without offering resistance.

With the array on the coffee table, Haldor Topsoe A/S has seriously entered the race to develop methods for producing superconductors for practical application in industry. Since two IBM researchers in the USA came up with a material which becomes superconducting at such high temperatures that its utilization will be profitable, the gold fever has prevailed in the international research world.

Today the limits are set only by the imagination. Electric current can be conducted over great distances without loss of energy, and this will result in enormous energy savings. Small, extremely strong electric motors become a possibility, and superfast computers, strong magnets and incredibly-precise-measurement analytical instruments for medical science are now realistic.

Scientists' assessment of the past year's breakthrough in research on superconductors is one of high excitement: "The world has changed," were the words recently at an international congress in the USA, which was called the Woodstock of physics. A host of euphoric scientists in the thousands flocked together there in order to see research's superstars present their research results. Driven by the dream of moving science's boundaries, of Nobel prizes, or of hard cash, they are doing research day and night in order to find a material which can gain the ability to superconduct at room temperature. All

travel has been discontinued for the moment at IBM's laboratories. They are working round the clock.

World Has Been Changed by Superconductors

Haldor Topsoe is being visited precisely at this time by Belgian Professor Eric Derouane from Namur University. The Belgian professor, together with his staff of 60 researchers, has gotten far in the development of superconductors.

It is Eric Derouane who is working with the schnapps cooler. He takes from it a little unimpressive black lump of metal and shows that it is not magnetic. He immerses it ceremoniously in the schnapps cooler and the lump moves away from a magnet.

A smile broadens on everyone's face. The professor's experiment just proved that it actually can be done: superconduction at a high temperature.

The head of the firm's basic research department, Henrik Topsoe, is excited: "This is a unique development in the sciences, and it has never happened before that so many suddenly jumped on board in a new field."

Henrik Topsoe will not disclose what niches the firm is concentrating on in superconductation, but he says, however, that electrical conductors are one of the most interesting. The firm has experience in producing catalysts made of porous and ceramic materials. Precisely the materials which enable superconductation are porous and have ceramic properties in the production phase. However, the firm does not know yet whether the production apparatus will be suitable. "It depends on which production processes will function, but we think that there are chances," Henrik Topsoe says.

Whether Haldor Topsoe will come to earn needed money from the production of superconducting materials is a completely open question. Henrik Topsoe: "It can well be that in a few weeks we will say that it was a very interesting field but everyone else ran quickly in the same direction. But it is always worthwhile devoting one's time to one chance in a thousand in a very big field."

Many have tackled superconductors because they are not so resource-demanding to devote one's time to. Any student can produce superconducting materials himself over a gas jet by mixing some powders of oxides and some carbonate and heating it all up to about 900 degrees. It is quite another problem to make usable materials, but development is proceeding rapidly.

Haldor Topsoe A/S is not the only one in Denmark into superconductors. Riso is also being visited at the moment by experts in the field, namely, Gabriel Aepli from AT&T's Bell Laboratories in the USA. At the moment he is in the process of doing experiments that indicate that superconduction can occur at even higher temperatures.

Open Cooperation Between Researchers and Industry

But they are working at high pressure also at the Danish Technical College, the H.C. Orsted Institute at Copenhagen University and at Arhus University. Developments in research have created new constellations: between research institutions and between institutions and industrial firms.

Representatives from Haldor Topsoe, NKT [Nordiske Kabel- og Traadfabrikker A/S [Nordic Cable and Wire Manufacturers, Inc.]], Riso, DTH [Danish Technical College] and Copenhagen University are participating in a Thursday club. Firms like Danfoss have also shown interest in working together. The Thursday club's members have no doubt that work on superconductors will occupy an important place in the industry minister's materials technology program, if it is adopted.

The question is whether the effort will come soon enough with the rapid development which has been in progress in recent months. Several countries in Europe have already held meetings on the government and researcher levels and are at the point of organizing a national effort. Many do not think that it will be long before practicable devices which use the new superconductors will be produced. IBM has already produced a measuring instrument that can measure signals in the brain and will be used for oil exploration, because it can register very weak magnetic fields.

It is the opinion of many that it will not be long before more widely circulated devices are developed for the market. Department Head Jorgen Kjems of Riso: "We, working together with Haldor Topsoe and DTH, have set to work on making these thin films so that they will become superconducting."

With the mammoth effort under way in the USA, Europe and Japan, it will not be long before the first products appear. However, there are big materials science problems which must be surmounted in order to obtain the sufficiently high currents required for electrical conductors and high-efficiency motors. "But within a year or two we will see products for electronic applications like superfast computers," Jorgen Kjems believes.

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AEROSPATIALE USING NEW CARBON FIBERS FOR ATR-72

Paris ZERO UN INFORMATIQUE in French 23 Feb 87 pp 45-47

[Article signed M.F.: "PAOMAD by Aerospatiale: Aircraft in Composite Materials"; first paragraph is ZERO UN INFORMATIQUE introduction]

[Text] Aerospatiale invented PAOMAD (computer-aided programming of the tape laying machine) to construct the ATR-72. POAMAD is a software tool acting as an interface between the CAD specifications of the Design Office in Toulouse and the manufacture of structural parts made of composite materials...entirely of carbon.

The ATR-72, a 72-seat regional transport aircraft, is the result of collaboration between Aeritalia and Aerospatiale. It is the Sky-Commuter, the door-to-door aircraft of the 1990's: Its first flight is scheduled for September 1988; the first delivery will take place in May 1989.

The ATR-72 is the third member of the ATR family, the first two being the ATR-42 and ATR-42F, with 42 seats each. Of course they have many features in common: the same cockpit design, the same digital architecture for all avionic equipment, same engine line, great similarities in operational support (spare parts, tools, documentation).

The ATR is also the largest aeronautics program using turboprop engines: The ATR-72 is equipped with two PW-124's, from Canada's Pratt and Whitney, each with take-off power of about 1,750 kW and specific fuel consumption of approximately 0.3 kg/km/hr.... A particularly economical and rather quiet engine which allows the aircraft to fly up to 2,800 km with a load limited to 6 metric tons.

In order to reduce weight and cost, composite materials are being extensively used in the wings of the ATR-42: the leading edges, the wing stub, the seal and edge strip covering [toits de fuite et bavettes], the support beam fairings, the ailerons and tabulators, and the flaps are made of carbon composites or Kevlar. In all, this represents 18.8 percent (approximately 1,000 kg) of the structural weight of the wings.

With the ATR-72, a new step has been taken because the use of composite materials has been extended to primary structural elements, reaching a total of 30 percent

of the structural weight of the wing. Introducing carbon fibers into the primary structure of the first aircraft of a series (civilian, for that matter) demonstrates the technological lead acquired by Aerospatiale thanks, in particular, to important programs conducted over the last 10 years: the Falcon V10F program in conjunction with the Avions Marcel Dassault company and research in a "carbon box forche primary structure" independently conducted by Aerospatiale.

By reducing structural weight, the use of composite materials allows an increase in payload. The use of composite rotor blades instead of metallic ones in the Super Puma helicopter resulted in a 6-percent increase (400 kg) in the take-off load. In the ATR-42, a 190-kg gain was achieved using composite materials.

The ATR-72's extreme wing stub (manufactured in Nantes) is a 1,500-liter box formed by two integrally stiffened carbon panels (extrados, intrados), with spars also of carbon and ribs (parallel to the fuselage) in light alloy. The box is 8.415 m long and 1.130 m wide.

Such a wing is designed by Aerospatiale's design office in Toulouse, using the ASELF (structural analysis by finite elements) system. It is in fact through calculation that the optimal design of a structure such as the ATR-72 wing stub is achieved: This involves a computer search for the best compromise between structural mass and cost--both to be reduced to a minimum--and an acceptable strength given the mechanical properties of the materials.

Moreover, calculations consider dynamic phenomena that may occur in flight (wing flutter). It is an extremely complex process requiring substantial computing power; in this case, a Cray 1S is currently used. Tomorrow, carbon aircraft of the future will have to be designed by a Control Data ETA 10 (power: 10 billion floating point operations).

Each extrados or intrados panel of the extreme wing stub was designed in this way and is constructed by piling some hundred layers of carbon fibers impregnated with epoxy resin, from 127 to 140 microns thick. In the course of its optimization calculations, the design office defines the shape of each of the layers and the direction to be given to the carbon fibers.

The composite material is then supplied in rolls 25, 75, 150, or 300 mm wide by suppliers such as Brochier, Ciba-Geigy, and NarmCo: Each roll is a unidirectional fabric of carbon fibers.

How does one optimize cutting of a roll to meet both the specifications of the design office in Toulouse and the requirements for layer shape and fiber direction of every layer of a panel? "The operation involves first cutting the sheet of composite material according to design; second, tape laying using templates with an appropriate aerodynamic shape--actually assembling the previously cut pieces side by side," explains Patrick Marechal (of Central Industrial Management at Aerospatiale); "then, the resin is polymerized, the panel undergoes ultrasonic testing, and possible machine work completes the manufacturing process."

To reach its objectives, Aerospatiale had to design and develop industrial equipment as well as software programs for use specifically with these composite materials. The Recoules company (in Ozoir-la-Ferriere) was thus licensed to study and design a Dejet shear machine with an eye to manufacturing production-line machines to equip Aerospatiale factories...with a water jet cutting at 10 meters per minute.

"The technology is multipurpose and makes it possible to cut any fabric," notes P. Marechal; "in addition, it is very reliable (low-maintenance), does not produce smoke, and can make multiple cuts: Several jets can work simultaneously with the same high-pressure water source, without the jets interfering with each other.

The first existing parts are currently being covered with composite material by hand using nylon templates. Manual production of the larger ATR-72 parts--cutting, handling, mass application of the hundred layers of preimpregnated composite material (some 3,000 to 4,000 cutouts per panel) is inconceivable. "We will test an automatic tape-laying system in collaboration with the Avions Marcel Dassault company."

This system includes the ACCESS (advanced composite cassette edit shear system) shear machine for tape laying with optimal scrap ratios and the ATLAS (advanced tape laying system) draping machine. "This system is the first in the world in which shearing and laying of successive layers are performed separately by two different machines."

There are some 10 other tape-laying machines in the world, used for instance by Boeing or Northrop, but all of these work in a single phase (shearing and tape laying by a single machine); but those machines do not offer the flexibility of tape laying in two phases: Their design tends to limit cutouts to very simple geometric forms--yielding a crap ratio 50 percent higher than that of the ACCESS-ATLAS system.

Beginning with unidirectional tapes 25, 75, or 150 mm in width, ACCESS cuts successive layers with swiveling cutters and forms them into cassettes ready for laying after removing scraps. These cassettes are fed into ATLAS, which has two tape-laying heads capable of handling two tapes with different widths, thus improving the cutout/scrap ratio. Swiveling along five axes, these heads lay the tapes on the template of the part to be produced.

Both machines were constructed by MFL (French Heavy Machines) within the framework of the ACP (Pilot Composites Workshop) program initiated by Aerospatiale in 1984 following a government procurement contract.

Operational flexibility: The ACCESS-ATLAS system is less susceptible to malfunctions than monophase machines. Possible defects in the material (spotted by the preimpregnated-tape feed), are more easily signaled by the system which then performs the necessary rejections. In short, a two-phase process is better!

[Box, p 46]

PAOMAD Optimizes Cutting

Aerospatiale's PAOMAD software determines for each draping layer, the optimal geometric form of the cuts to be made by ACCESS and calculates the laying paths to be followed by ATLAS.

PAOMAD calculates the cutting and laying times, establishes the operator's instruction cards, provides numerical control programs, and calculates the material needed (for use by the supply service).

The operator may intervene at any time (during an interactive graphic process) to modify a cut if he considers PAOMAD's performance unsatisfactory (particularly when the cutouts are too small). There is obviously justification here--perhaps later on--for an expert system.

In addition, PAOMAD positions the cutouts one after the other in reverse laying order: The cutouts are in fact inserted between two protective films that are rewound as they leave the ACCESS machine. This provides a roll of cutouts in the proper order for use by the ATLAS machine. PAOMAD ensures that the edges of the cutouts do not overlap to avoid gaps in material; it also measures clearance so as to profit from tolerance (two successive cutouts must not overlap): The task of generating the cutting programs falls to a post-processor.

PAOMAD also generates screen simulations (on a Tek 41 Xy, for example) of the movements of the tape-laying machine and determines the laying paths for use by ATLAS.

PAOMAD can also assist in manual tape-laying operations for today's Airbus: water jet cutting with a Dejet 300 machine (specifically for 300-mm wide tapes), manual laying on nylon templates; PAOMAD automatically generates these SET-format templates on a flat plotter...with final automatic cutting of the designs.

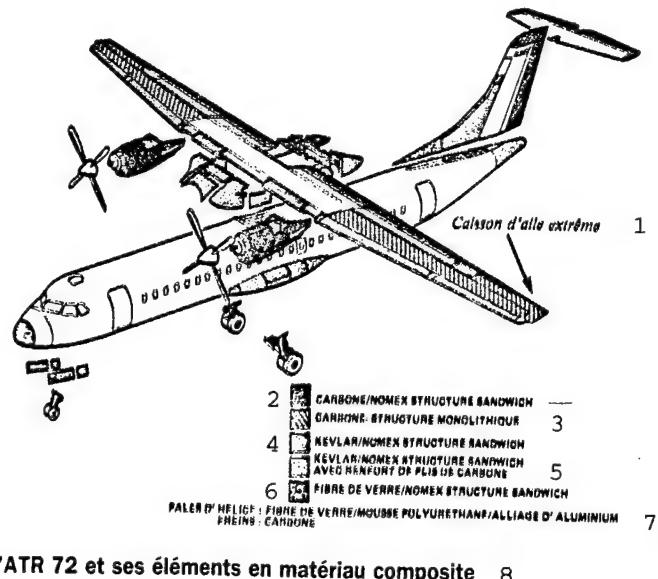


Figure 1. (Page 45) The ATR-72 and Its Composite Materials Parts

Key:

1. Wing tip box
2. Carbon/Nomex sandwich structure
3. Carbon monolithic structure
4. Kevlar/Nomex sandwich structure
5. Kevlar/Nomex sandwich structure reinforced with carbon layers
6. Glass fiber/Nomex sandwich structure
7. Propeller blades: glass fiber/polyurethane form/aluminum alloy
Brakes: Carbon
8. The ATR-72 and Its Composite Materials Parts

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NETHERLANDS FOKKER FACES FINANCIAL DIFFICULTIES, COMPETITION

The Hague ANP NEWS BULLETIN in English 11 May 87 pp 2-4

[Text] Amsterdam, 11 May--The fall in the dollar has caught Dutch aircraft maker Fokker just when it was making a difficult switch from its successful F-27 Friendship and F-28 Fellowship planes to a new generation of passenger aircraft.

"The switch from one production line to another is always a hard time for plane-builders," said analyst Bill Coleman of British stockbrokers James Capel.

"And the weakness of the dollar can't help a company which gets most of its revenue in dollars," he added.

Fokker, which recently negotiated delays in debt repayment to the Dutch Government and other creditors, says it hopes to diversify in order to bridge the gap in coming years.

Presenting the firm's annual 1986 annual report last week chairman Frans Swarttouw said Fokker planned to reduce its dependence on its two new civil aircraft the F-50 and the F-100.

High start-up costs and sharper competition in the aircraft business had prompted Fokker to change tack, he said.

He said the company hoped to boost income by increasing its secondary activities such as plane maintenance and repair, defence orders and minor roles in projects like Airbus.

NATO

Fokker sees military activities, which now account for about 15 percent of total turnover, as an expansion area, and said it had been approached by NATO regarding forthcoming projects.

But analysts doubted that these minor activities would bolster profits in the short term and they forecast a lower 1987 income.

Last year net profits fell 42 percent to 19 million guilders, hit by claims from customers and delayed deliveries.

At the end of 1986, two years after pinning its hopes on a future boom in the small airliner market, Fokker had 126 orders and 103 options on its two latest aircraft.

But even with an order book of six billion guilders--its biggest ever--Fokker is dwarfed by giants such as Boeing and McDonnell Douglas of the United States, and the European consortium Airbus Industrie.

The advanced, fuel-efficient F-50, aimed at the liberalised European market, replaced the successful F-27 Friendship which was discontinued last year.

Best-Seller

During 30-years of production, the F-27 had 786 sales, making it the world's best-selling civilian prop-jet aircraft.

The jet-powered F-28 Fellowship, introduced in the mid-1960s, reached 241 sales on being terminated last year in favour of Fokker's second new introduction, the updated twin turbo-fan F-100.

But while U.S. manufacturers continue to enjoy a flow of new orders, Fokker, crippled by a dollar now around two guilders from an average of 3.35 guilders in 1985, last year made only one advance sale on its F-50 and 49 on the F-100. Traditionally, Fokker sold strongly in North America.

The new planes, and the boldness of their introduction both within the same year, owe much to the presence of Swarttouw, 54, at the top of the organisation.

He made a clean sweep of the management structure soon after joining the board in 1978, and has managed to retain the commitment of the Dutch Government, which refloated Fokker after World War II in a bid to revive the national aircraft industry.

But Swarttouw said the level of Fokker's state aid was limited compared with plane manufacturers in other countries, where some governments met 90 percent of production costs.

Fokker's government loans and state-backed credit exceeded one billion guilders at the end of 1986 with about 60 percent of new production costs being put up by the state.

With the 100-seater F-100 Fokker said it was aiming at a 30 percent share of the world market, which it puts at 1,100 to 1,200 planes up to 1995.

But Fokker sees the 100 seat market as much smaller than the 150-seater, where Airbus and McDonnell Douglas dominate.

It sees more positive long-term prospects for the F-50 50-seater and is aiming at a world market share of around 50 percent for this type by producing 24 planes a year.

This plane, suited for shorter-haul flights, could benefit gradually from the deregulation of air routes, Fokker said.

But here Fokker faces competition from a number of aircraft manufacturers including British Aerospace, and De Havilland Aircraft of Canada, owned by Boeing.

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ARIANESPACE PROJECTS V-19 LAUNCH IN AUGUST

AU161535 Paris AFP in English 0217 GMT 16 May 87

[Text] Paris, May 16 (AFP)--The European space rocket Ariane, grounded for the past year, will resume flights in August, the firm Arianespace announced here Friday.

Unveiling a 2.47-billion-dollar programme of 30 launches up to January 1991, aimed at placing a total of 46 satellites into orbit, Arianespace said it would await delivery of a new third-stage rocket motor at the launch site in French Guiana, probably in June, before naming the precise date in August when it would launch flight V-19.

Flight V-18, on May 31 last year, was blown up by mission control at the Kourou space centre because of a failure with the ignition mechanism in the third stage of the Ariane-3 launcher.

Arianespace said it hoped to carry out three launches this year, eight in 1988 and nine in both 1989 and 1990, and one in 1991, in order to meet its current orders. The launches would involve 20 new Ariane-4 rockets, the firm said.

Director-General Charles Bigot said the first Ariane-4, which would probably be launched in November or January, would carry three satellites--the European weather satellite Meteosat-2, the amateur radio enthusiasts' satellite Amsat, and an American telecommunications satellite Panamsat.

He said the August launch would carry aloft the Australian and European telecommunications satellites Aussat-K3 and ECS-4.

Mr. Bigot said Arianespace, the marketing arm of the European Space Agency (ESA), hoped to hold a 40 to 45 per cent share of the market, compared to its 50 per cent share at present.

But he acknowledged that provisional bookings for 1991-1992 might not be fulfilled if the Americans got their Titan and Thor-Delta rockets back into service.

He said the Chinese Long March III and IV rockets and the Japanese H-2s would be serious rivals by the middle of the next decade, although the Soviet Proton programme had suffered setbacks.

/8309
CSO: 3698/524

BRIEFS

SHELL, GIST BROKADE JOINT VENTURE--Delft, 23 Apr--Dutch biotechnology group Gist Brocades hopes to complete negotiations in the summer to set up a joint venture with Shell Petroleum, the group said during the presentation of its annual report on Thursday. The venture, for which negotiations were announced last December, will produce fine biochemicals, biopolymers and industrial enzymes in a 50/50 deal with the Royal Dutch/Shell subsidiary. The new company is expected to have a turnover of 300 million guilders and affect 800 workers. During Thursday's presentation, the company said it was struggling with an increased overcapacity of 30 percent, due to cancellation of orders for dry yeast from African countries. It said first quarter figures had confirmed predictions that cyclical market conditions, lower profit margins and currency fluctuations would continue to affect company results negatively. Gist Brocades said it was possible there would be a slight fall in profit per share for the first quarter of 1987. The company last month announced a 1986 net profit of 111 million guilders, compared with 100 million guilders in 1985. [Text] [The Hague ANP NEWS BULLETIN in English 24 Apr 87 p 3] /9274

C60: 3698/503

FRG ARTIFICIAL INTELLIGENCE R&D AT GMD, SIEMENS

Paris INTELLIGENCE ARTIFICIELLE in French Mar 87 pp 1, 4, 5

[Excerpts] Until the beginning of the 1980's, artificial intelligence had received very little funding in Germany. The relative disinterest on the part of the Government agencies responsible for administrative supervision of this field of endeavor had its counterpart in the lack of research incentive on the part of the university teams. One German researcher (Mr Peter Hoschka, of the GMD [Mathematics and Data Processing Company]), to whom we are indebted for the greater part of the information contained in this article) notes in this regard that "artificial intelligence is not held in high regard everywhere in the German universities, and that for a long time those associated with it found their tasks anything but easy within their respective faculties." This situation has changed radically since the start of the 1980's. The universities, the federal authorities, and industry, are all showing interest. A good indication of this trend inversion is provided by the number--a large one--of highly qualified students who have turned towards AI [artificial intelligence], giving rise to hope for an easing, in due time, of the principal "bottleneck" in the development of AI in the FRG: The scarcity of qualified personnel.

This erstwhile relative disinterest has nevertheless left its mark: As of today, research and training are still concentrated in a relatively small number of places. We might cite in particular the Universities of Berlin, Erlangen, Hamburg, Kaiserslautern, Karlsruhe, Munich, Saarbruck, and Stuttgart. Other projects exist in the Universities of Bielefeld, Dortmund, Oldenburg, and Ulm. Among the extra-university research centers--which are a preeminent factor in research in the FRG--GMD and the Fraunhofer Gesellschaft company have intensively developed their AI expertise over the past several years.

The number of AI products on the market is small, even though the major German manufacturers--Nixdorf, Siemens, Triumph Adler--have introduced several products in this market. The software and consultant companies, on the other hand, are taking a back seat. There are exceptions, such as InterFace (see IAF for last September) and GEI [Electronic Data Processing Company] in Munich, SCS [Scientific Control Systems] in Hamburg, and Danet in Darmstadt. But the German subsidiary of Batelle--installed at Frankfurt--and the Dornier (Friedrichshafen) software subsidiary are, on the contrary, very active.

As regards demand and application, the German automotive industry plays an advanced role. BMW, Daimler-Benz, and Volkswagen formed, jointly with Siemens, in 1983, a research and development company for the automotive industry--designated the Innovationsgesellschaft fuer fortschriftliche Produktionssysteme in der Fahrzeugindustrie (INPRO) [Company for Innovation in Advanced Production Systems for the Automobile Industry]--situated in Berlin. In addition to its research in the areas of manufacturing methods and robotics, INPRO made ES [expert system(s)] one of its principal topics of research. An initial application was developed in regard to diagnostic work on motors as they come off the production line. Daimler-Benz was chosen as the pilot user. This ES, designated the IXMO, was developed at the University of Kaiserslautern around a central processor that was already being used in medical diagnostics. INPRO's ES team today numbers eight engineers. The second product designed by this team is an ES for the planning of the manufacturing and processing of metal sheets. INPRO's philosophy is to furnish to the companies concerned the ES's central processor. The companies then adapt this processor to their individual needs. Thus, the BMW firm installed its own version of the IXMO system in its Steyr (Austria) plant.

As regards software, the market is presently still very heterogeneous. The first company to position itself in it was Nixdorf, which markets an ES development central processor designated TWAICE, developed in Prolog using EMYCIN concepts. The Interface Computer GmbH company, founded in 1982 at Munich, has developed a version of Prolog, designated IF-Prolog, which can be installed very easily in different UNIX computers, because it is written in C (see the September issue of IAF). The Epsilon company, based in Berlin, has developed another variant, the MPROLOG. A few new companies are offering services and training in the knowledge engineering (example: the Expertise company in Berlin and Insiders in Mayence).

The Siemens company has deployed major efforts in ES. The first operational system is a "configurator," designated SICONFLEX, for the operating systems of the large computers offered by Siemens. The BP oil company's SCS subsidiary, based in Hamburg, also so has a good AI team. The company is currently involved, as are the above-cited companies, in various ESPRIT projects.

[Boxed material p 4]: Expert Systems at GMD

The GMD company is one of the most prestigious of the independent research organizations beyond the Rhine. It is also one of the centers of AI expertise. GMD has specialized in expert systems since the beginning of the 1980's. In 1983, it formed a specific-research group among the staff of the Institute of Applied Data-Processing Technology (which is under the GMD). The objective of this group is to develop tools for the construction of expert systems. A first prototype, the Babylon, is being used as a test bench for the various developmental projects that have been undertaken in this domain. Broadly speaking, the system encompasses:

- all the formalisms presently used to represent knowledge (logic, frames, rules), with associated inference techniques;
- the pre-established dialogue procedures for interrogation in the conversational mode during the inference process;
- the mechanisms for explaining the conclusions arrived at by the ES.

The system is used on Symbolics machines and provides access to the basic language, i.e., Zeta-Lisp. Compared to other systems that have appeared meanwhile on the market and coming from the United States (Kee, Art, Knowledge Craft, and S1), Babylon is characterized by its particular architecture, specifically its way of integrating the different formalisms used to represent knowledge ("distributed problem-solving" architecture). Use of this architecture opens the system to any desired further extension. Babylon is widely used today by industrial research teams, at sites numbering 19 as of now (including the INPRO company--see above), but also at an installation in Holland and one in Japan. The Babylon system is the central processor for two common projects instituted by the BMFT in the domain of AI-intensive systems (TEX-1 and WEREX). The objective of the WEREX project is to provide a tool for the developing of ES's having the same specifications as Babylon but designed for use with computers operating on MS-DOS or UNIX. The installation language used is INRIA's LeLisp.

9399
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BMFT FUNDING FOR FRG ARTIFICIAL INTELLIGENCE PROJECTS

Paris INTELLIGENCE ARTIFICIELLE in French Mar 87 pp 4-5

[Text] In 1984, the BMFT [Federal Ministry of Research and Technology] launched a "program to encourage the development of microelectronics and of information processing and communication techniques." This program provides the basis for the public funding of AI development projects in the FRG. Scientific and industrial experts, as well as professional associations of the electronics industries, were all asked to take part in the drawing up of the program. This bringing together of minds had as its object the setting up of the "rules of the game," the terms of reference governing Federal funding. These rules of the game are essentially four in number:

--The development and commercialization of products to be marketed are exclusive to the province of the enterprises;

--The state is responsible for creating the basic conditions essential to the development of IA in the industrial domain (training and basic-research structures);

--The state supports the industry by providing financial aid to any long-term research and development project that shows no hope of profitability within the near term;

--Several enterprises collaborate on each project and, as a general rule, universities and research centers are also brought into it.

Federal funding is not provided unless the industrialists themselves finance 50 percent of the developmental costs of those projects they undertake alone, and also co-finance 25-50 percent of the work done by research organizations in which they are partners. The BMFT's budget provides, for this plan, an overall expenditure of 3 billion DM, of which some 520 million DM will be devoted to the subsidizing of AI-intensive projects. It was decided to concentrate these funds on four topics: Computer-aided development of software and hardware; new architectures for computers; recognition of shapes; and knowledge processing. As of 1985, the projects entered their realization phase, which will end in 1988.

Computer-Aided Development of Software and Hardware

Under this topic the hardware builders and producing companies are being asked to jointly define standards for the components [made available to] new-generation software engineering workshops.

New Computer Architectures

Work under this topic is being centered on the SUPRENUM-1 project, which, by combining optic-fiber cabling and traditional components, aims to attain computer powers of up 1 gigaflop. Essentially, SUPRENUM-1 is being developed with sights set on the numerical simulation of scientific and technical problems and will therefore be equipped with a specifically-based mathematical software which is to be developed under this same project. Other projects concern a fast image-processing computer (to be integrated with shape-recognition systems) and a Prolog processor.

Recognition of Shapes

Under this topic, the term "recognition of shapes" is to be understood in a broad sense: This subprogram also concerns the recognition of spoken language as well as the recognition of images and of animated sequences. The latter should find concrete applications in automated quality control and early-warning diagnostics of worn or damaged parts, through interpretation of mobile images captured by autonomous vehicles (lift trucks, robots, etc). The recognition of spoken language (at a normal speed of elocution and over a wide range of vocabulary) will be applied initially to interfaces with computers and data banks.

Knowledge Processing

This is the domain that converges the most organically with AI. The principal topics being pursued are: dialogue with expert systems; computerization of the acquisition of knowledge; representation of the knowledge in the machine; mechanisms for automating the conclusion of reasoning based on given data; the ability of ES's to explain their handling [of the data]; and tools for the construction of expert systems.

[End of text; listing of projects being subsidized by the BMFT follows]:

Knowledge Processing/Expert Systems

<u>Project</u>	<u>Partners in Project</u>	<u>Duration</u>	<u>Total Subsidies (Millions of DM)</u>
Acquisition of knowledge and use of expert systems for the providing of services (LERNER)	Nixdorf AG, Stollman GmbH, TU [Technical University] Berlin	1985-1988	6.5
Representation of knowledge and reasoning procedure for physico-technical systems as a unitary base of technical expert systems (TEX-B)	FhG [Fraunhofer Institute]-ITTB, Battelle-Institut, GMD, PCS GMBH, Siemens AG	1985-1989	8.8
Technical expert systems for the interpretation of data, diagnostics, and procedural guidance (TEX-1)	Siemens AG, Bayer AG, ESGmbH, Krupp, Atlas, Elektronic GmbH, FhG, ITTB, GMD	1985-1988	10.4
PLAKON: Expert system - basic processor for the tasks of planning and configuration (TEX-K, in preparation)	Philips GmbH, Battelle-Institut, Siemens AG, URW GmbH, University of Hamburg	1986-1989	Not yet announced
Coordinated system of tools for the construction and use of expert systems (WEREX)	GMD, ADV/ORGA Fa. Meyer AG, Danet GmbH, PCS GmbH, Siemens AG, University of Erlangen, University of Munich	1985-1989	10.2
Consultation and dialogue based on knowledge (WISBER)	University of Saarbrucken, Nixdorf AG, SCS Orbit GmbH, Siemens AG, University of Hamburg		10.1
Knowledge-based systems for office communications: Processing of documents, organization, human-computer communication (WISDOM)	Triumph-Adler AG, FhG-IAO, GEI Systemtechnik, GMD, TU Munich, University of Stuttgart	1984-1988	25.2

Recognition of Shapes
Processing of Images and Language

Project	Partners in Project	Duration	Total Subsidies (Millions of DM)
Autonomous mobile systems	Daimler Benz AG, University of Stuttgart, Carl Schenck AG, FhG-ITTB, Bundeswehr University	1985-1989	4.8
Analysis of documents	AEG-Telefunken Kommunikationstechnik AG, Siemens AG, Philips Kommunikations Industrie AG, RWTH Aachen	1985-1988	14.5
Multisensorial system for interpretation of industrial situations: --multiple-echelon intersensorial processing of images --monitoring of machines by means of diagnostics based on acquired knowledge	FhG-ITTB, AEG-Telefunken Anlagen-technik AG, Kontron Bildanalyse GmbH, Philips GmbH, Siemens AG, Signum Computer GmbH, Carl Zeiss, Daimler Benz AG, Heller GmbH, Interatom GmbH, Krupp Atlas Elektronik GmbH, University of Stuttgart, Universith of Munster, TU Munich, FhG, University of Karlsruhe	1985-1988	20.2
Language recognition: Human-machine dialogue with recognition of continuous language	Siemens AG, Philips Kommunikations Industrie AG, AEG-Telefunken Anlagentechnik AG, TU Berlin, University of Erlangen	1984-1989	10.2

9399
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FRG-PRC: SIEMENS COMPUTER PROCESSES CHINESE CHARACTERS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 5 May 87 p 8

[Article by RE: "Siemens-Computer Processes Chinese Characters; Pinyin Input Process with Various Options/1800 Characters Strong"]

[Text] FRANKFURT. Siemens AG, Munich/Berlin has created the possibility of processing Chinese script on the Series 7500 main frame computer using the BS2000 operating system. Chinese script is made up of approximately 50,000 different characters, composed of about 2000 basic elements (strokes and graphic components). According to Siemens' press release, in the course of language reform, the Chinese have considerably simplified the number of strokes and have chosen the dialect spoken in the Beijing region as the language of government and commerce. A Roman-character transliteration system (Pinyin) has been developed for this language. In their standard GB 2312-80, the Chinese have established a basic character set of 6763 characters for processing this script. However, the new Siemens system is supposed to be able to process as many as 18,000 characters, including the basic character set.

As Siemens goes on to report, up until now inputting the Chinese characters has been a critical point in the data processing of Chinese script. More than 400 procedures for doing this have been developed in China. The Pinyin input process that Siemens has decided to use recognizes various options such as frequency, pitch, abbreviated forms, and word input. It claims to be a process for inputting the radicals as well as the GB-code assignment. It is supposed to be possible to integrate other input procedures in the process. According to Siemens' description of the system, the standard keyboard is used for data entry. The user inputs the Chinese characters as Roman letters or numbers. The PC 16-20/C serves as the input hardware. Independent of the BS 2000 operating system, the personal computer can also process the Chinese characters off-line using the Textstar test editor provided by Siemens. File-transfer or data display terminal-emulation (9750-emulation) will provide a problem-free system link between the central computer and the personal computer.

The new system is supposed to be very flexible. Modification at the operating system level and a special two-byte code in the MS-DOS and BS2000 operating systems is designed to free the user from time-consuming language adaptation. In spite of these changes, Siemens emphasizes that the system has retained full compatibility and loadability for Roman character applications.

The decisive impetus for this project, which Siemens has developed together with German universities, was a purchase order from China. Siemens reports that since April of this year, various government institutions and 18 universities in this country have been involved, primarily in building and using large data banks, as well as in research.

13127
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DANISH DATAKO GETS LARGE LAN/WAN DEAL WITH FRG

Copenhagen BERLINGSKE TIDENDE in Danish 21 May 87 Pt 3 p 1

[Article by Henrik Damm: "New Million-Kroner Order for a Young Computer Science Firm"]

[Text] Datako is beginning a partnership with the West German Telemation company in the marketing of data networks. The order is worth between 30 and 50 million kroner over the next two years.

The new Danish electronics firms are quite capable in the international context. Last week Dansk Data Elektronik "did in" a number of multinational companies in the fight for a 55-million-kroner order for the Postal Service.

Yesterday another young Danish computer science firm entered into a notable agreement.

Datako, which is only two and one half years old, signed a marketing agreement with the German Telemation company for the marketing of Danish products in West Germany. Telemation has branches in Hamburg, Dusseldorf, Stuttgart and Munich.

"We expect that the agreement will mean between 50 and 80 million kroner worth of business over the course of 1987 and 1988," Managing Director Hans Peter Bech tells BERLINGSKE TIDENDE.

According to Hans Peter Bech, Datako produces the only so-called Local Area Network (LAN) and Wide Area Network (WAN) in Europe. The West German market represents about 10 percent of the world market.

Hans Peter Bech makes no secret of the fact that the firm, in spite of previous contacts in the incredibly conservative German market, made a hit for real at one of the world's largest computer science fairs, CeBit in Hannover, earlier this year.

8831
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ITALIAN RESEARCH MINISTRY OUTLINES CNR REFORM LAW

Rome MINISTERO PER IL COORDINAMENTO DELLA RICERCA SCIENTIFICA E TECNOLOGIA in Italian 8 Oct 86 pp 1-11

[Contents of the Bill for the Reform of the National Research Council (CNR)]

[Text] 1. General Political Considerations

The drafting of the Bill for the reform of the National Research Council (CNR) took place at a time, which, bearing in mind the development of the recent governmental crisis, corresponds to the commitment made in Parliament in April and June 1986 by the minister for the Coordination of Scientific and Technological Research.

The need for setting in motion an organizational reform of the CNR is widely shared by all political forces, both in the majority and in the opposition, some of whom have fine-tuned their own proposals.

The Commission, which was set up to work for the Council of Ministers and was chaired by Professor Luigi Dadda, has made it possible to fulfill this commitment by completing its work and submitting its studies and proposals on the overall state of scientific research in Italy and, in this context, on the reform of the CNR.

These proposals, as well as those already introduced during various cultural, parliamentary, trade union and political sessions, were taken into account as much as possible both because the reasons that inspired them were mutually shared and in order to encourage the broadest possible consensus and thus ensure that the hopes for an expeditious approval of the reform would not be jeopardized.

Many times in the past few years, and in increasingly urgent tones, both public opinion and the most influential scientific and governmental circles have voiced complaints about the unsatisfactory state of scientific and technological research in Italy, both from the quantitative and qualitative points of view. Moreover, it is common knowledge that this field finds itself in the throes of serious difficulties, both because of the overall magnitude of the financial and human resources assigned to it and because of its efficiency level in general.

The commitment to allocate increasing resources to the research budget, which

will attain a 2.5 to 3 percent share of the PIL [GNP--Gross National Product] (currently 1.46 percent) by the early 1990s, is aimed at encouraging the modernization of Italy and narrowing the gap with other more advanced countries; however, it requires the strengthening of the ongoing reorganization of the field with a legislative reform that will guarantee maximum results from the current planned measures. The same procedure should be followed to overcome the serious personnel shortage. In this regard, the Dadda Report correctly points out that, together with an adequate increase in financial resources, consideration should be given to a sizeable increase in personnel assigned to research, to planning or to its training aspect as well; personnel is just as indispensable, if not moreso, as the grants for an effective quantitative and qualitative development of the operation.

The difficulties in a comprehensive channeling of the available resources themselves are known and are caused by the existence of multiple decision-making centers at the operational level and to the absence of a central coordinating and planning agency having sufficient power at the political level. The efficient use of available resources is, in short, often slowed down or thwarted by inadequate or obsolete administrative regulations, with the creation of deficit balances as a consequence.

Hence, even the possibility of a wider use of resources is dependent on organizational reforms that would make the various components of the system conform to the new needs.

This broad field of problems requires quite a number of legislative measures that should be of interest to:

- a. The steering and coordinating agencies of the government, returning to a single interministerial committee the functions now scattered among a large number of agencies;
- b. The office of the minister for Scientific and Technological Research, which, going beyond its present structure, must become an actual ministry, even if it were of a new type, because of the nature of its functions that are not those of management, but rather those of directing promotion and coordination of all the activities of the sector;
- c. A guideline law [a regulatory law defining the statutes of an agency's organizational structure to which additional statutes may later be added] for the overall oversight of public research agencies, whose management is often outdated and in need of improvement, in order to guarantee, in addition to a useful plurality of the system, roles that are effective and balanced in their fundamental legal and regulatory aspects;
- d. The means of support for industrial research need to be developed and streamlined, the adoption of specific tax exemptions, of new regulations on patents, and a fund for international scientific and technological cooperation;
- e. Certain aspects of the regulation on universities itself, whose free involvement in the public, social and production problems of the country has not yet reached satisfactory levels. This is particularly true as regards scientific

research wherein the university has been primarily delegated and should increasingly place itself in a broader framework that takes into consideration the many social and productive realities of the country in view of its overall development.

A dynamic and organized renewal plan of the scientific and technological research system in Italy must take into consideration this overall aspect, as has been stated many times. However, it would be counterproductive to draw the conclusion from this that only a single legislative reform act is necessary. As a matter of fact, such an act, in addition to the obvious diversity of the subject matter, would present aspects of difficult feasibility in Parliament, if only within a reasonable, foreseeable time-frame. Actually, the problems to be solved are too numerous and complex and the inevitable perplexity of each of them would hinder the approval of so ambitious a project. Consider just one of the many possible examples: the structure of the ministry, which, it is believed in many circles, should be that of a full-fledged [pleno jure] ministry instead of a bureau of the Office of the Presidency of the Council of Ministers as it appears in the Bill on the Presidency of the Council of Ministers now under consideration. Still others authoritatively assert, for a variety of reasons, many of which are certainly valid, the necessity for shaping the ministry on a model of "higher education and research," following the recent French example.

2. The Objectives of the CNR Reform

The decision to introduce a reform, primarily involving only the CNR, is prompted by the awareness of the difficulties engendered from having to resort to an all-encompassing law and, at the same time, by the desire to bring under the same statutes a number of bits and pieces of the reform of the CNR itself that risked remaining separated from one another and would, therefore, be unable to promote a comprehensive framework for new development.

The same debate that is to precede and go along with the approval of the proposed regulations could be used by the government, while the debate is still in progress or immediately following it, as a useful contribution to fine tune the other bills that have been mentioned and must themselves be coordinated with the aim of solving the remaining problems concerning the entire system of scientific and technological research. Therefore, it is evident that the awareness of the problem as a whole, on which CNR's reform is predicated, even now gives the latter a strategic value and a significance that transcends the very stature of the agency.

Parliament has repeatedly expressed the need for broad reform and, most recently on the occasion of the enactment of Law 360 of 8 July 1986, which regulates the advisory committees of CNR on a new basis in view of the forthcoming reform, approved by a large majority the agendas introduced by the opposition of the Left that were accepted by the Government because they reflected a many times expressed wish. In its report, approved on 17 April 1986, the Chamber of Deputies' P.I. [Civil Service] Committee emphasized the need to distinguish "between the advisory functions of the Council and its role as a research agency," to remove the CNR "from the list of agencies that come under the provisions of Law No. 70 of 1975," to take care "of the special character of the research

work when dealing with the problems of the legal status and financial remuneration of personnel." In a document, approved on 26 June 1986, that was in many ways similar, the Senate's P.I. Committee reiterates the advice about ensuring in the reform of the CNR "the flexibility, the mobility, the competitiveness and the dynamics necessary to place research personnel at an adequate legal level of remuneration and at a high level of professionalism."

In keeping with such suggestions, the CNR reform bill has been conceived for the purpose of totally overcoming, from a legal standpoint, the present conditions. The inclusion of the agency in the government-controlled organizations, in accordance with Law No. 70 of 1975, although motivated by the rationalization that it would not create a bureaucratic onus, has actually created negative results in the areas of efficiency and dynamics. It is this, among other things, that created the deficits, the delays of the actual grants already approved and an excessive levelling of professional capabilities existing within the agency, and runs the risk of being unable to compete with other research institutions, beginning with the universities.

The CNR, however, still has great potential both because of its quantitatively significant size (it spends 20 percent of the public monies allocated to research and has a staff of over 6,000 research, technical and administrative employees, almost all of them rated as good or excellent), and more importantly because of its institutional duties, which remain an essential link between the scientific community and the university as well as industry and public services and because of its current and favorable position, which characterizes it, in the direct management of research projects and promotional and financial activities.

CNR's particular nature is to be found in this multifaceted dimension, which may appear to be complex and in need of being simplified to those who do not take into account the specific natures of the scientific and academic worlds and of research activities. In fact, the scientific community finds it more suitable to be represented by an independent agency rather than by the bureau of a ministry. The choice of a multisegmented structure, which, on the other hand, does not preclude the formation of single agencies--as, for instance, those of energy and space--itself fosters the usefulness of the interdepartmental exchange of knowledge and the flexibility of its structure for the parallel operation of future agencies.

The fundamental choice, on which the CNR reform is based, gives the agency a different legal configuration, both from that of the traditional governmental agency and that of a private enterprise. This strict distinction, which places on one side agencies formed as governmental organizations based on principles of rigid guarantees and, on the other, private enterprises that should be of a competitive nature, if not actually profit-oriented, does not conform to the new functions that governmental agencies have often adopted in the past few decades and mostly involve services or the management of services. The strict logic of private enterprise cannot relate to these because of the priority given by consumers, as a whole, or as a sector, over the very interests of a research agency and its staff. However, the too rigid traditional model of public affairs cannot conform, in every aspect, to an activity that does not weigh authoritatively on subjective situations, but is directed towards attaining modern and flexible service objectives.

At present if there isn't a "pigeon-hole" or a stereotype in which to place, without leaving out anything, agencies such as the CNR and the ENEA [European Nuclear Energy Agency] itself or other similar agencies, the main objective of the reform is precisely to create the legal premises so that their structure could be inspired by flexible, functional and clear models that are different from the traditional ones. Thus, a very important way will be opened for the general modernization of governmental agencies in Italy, for a new category of "service agencies" with their own characteristic features. In looking forward to and in anticipation of this, the new CNR regulations provide that, within the basic principles established by the law, the agency's organization, its proceedings, the means of overseeing its activities and employee relations be defined by independent acts of the organizations having jurisdiction and, for matters falling within the purvue of labor unions, of the negotiations between the agency and the labor unions, taking into consideration the need for balancing the financial and legal treatment of all research personnel. Within this streamlined operational framework the possibility of the agency's participation in private enterprise or in conglomerates with special projects is seen and it is additionally expected that for certain activities, CNR might acquire part of its resources on the open market. Moreover, this characteristic of the agency goes hand in hand with the necessary guarantees, under the guise of a specific ministerial authorization (oversight by the minister for Research), because these means, although justifiable because of the flexibility they engender, cannot ignore the general interest and an ultimate responsibility of a political nature.

3. Outline of the New Regulations

With the new legal status, the agency is able to discharge more appropriately its duties as an institution.

It is, in fact, permitted to determine:

The proper balance between holding on to the specific and positive characteristics of the agency and its modernization;

A closer connection with the objectives of national planning, without surrendering the nature of freedom peculiar to the function of promoting knowledge;

The preservation of a structure that represents the scientific community at the same time that it takes on the aspect of an agency, provided, as are the others, with its very own management organization, with an effective distinction between its functions of administration, consultation and oversight in a proper balance between the duties of promotion and proposal that are part of the scientific dimension and the administrative tasks that should be assigned to ad hoc organs;

The maintaining of proper relations with the other scientific and academic institutions (above all, the universities), with industry, public management and services, other research activities and, at the same time, strengthening the independent operational potential of the agency.

It is on these criteria that the outlines of the new regulations of the CNR

were created in a context of efficiency of the agency, of flexibility of its structure and of the utilization of already available human resources or those to be acquired by the agency.

The institutional purposes of CNR are better defined and are related to the role of fostering and developing knowledge, scientific and technological capabilities directed at the public, economic and social development of the country.

Among the most characteristic duties within this context there are specified those of participation in the planning of scientific and technological research, of its financing and its management through its own departments and undertakings open to useful outside contributions; the duties of promotion and development within the scope of governmental guidance and authorized by the ministers of Research and Foreign Affairs; those duties of international cooperation in the areas falling within its field; those of documenting and reporting on research and advising the State, the regional governments as well as other governmental and private agencies, enterprises, partnerships in conglomerates, in accordance with specific agreements; the duties of developing educational and requalification activities for research personnel; the responsibility--not falling by law within the jurisdiction of other agencies--of ensuring that services will be provided for the renewal and certification of technological qualifications and the determination of the suitability of products.

The most relevant innovation resulting from the new legal status and the separation of the administrative functions from those of planning and oversight consists, under the organizational charter of the agency, of the creation of a nine-member board of directors (president, vice president, three members elected by the assembly of the National Advisory Committees and four members appointed by the prime minister and the ministers of Research, Education and Budget from among experts in administration and business and financial management whose purpose will be to prevent the damaging sides of handing out patronage jobs to satisfy party demands and whose duties are given greater importance by the broadest regulatory powers and by the considerable autonomy of the organization, financial management and accounting of the agency.

The new title (Scientific Council) adopted by the present management seems more appropriate by placing emphasis, not on the managerial roles, but on those of consultation, promotion and scientific verification. The difference in the duties does not actually impair the importance of this agency; as a matter of fact, it highlights its leading role in guiding the agency.

While the president and the director general (proposed by the board of directors to the minister exercising oversight) are essentially retaining their present status, the office of the vice president, elected from outside the membership of the board of directors, seems to be more attuned to an improved operation of the agency with his role of delegated responsibilities and as deputy.

Regarding the National Advisory Committees, the recent thorough debate on their make up makes it possible to refer to the regulations in force (Attachment 1) for their oversight, with the exception of the specific interspecialty committees for which the arrangement made to resort to separate decisions, approved by the minister exercising oversight, in accordance with the provisions of the regulations and corresponds more to the overall trend towards deregulation that is a fundamental part of the reform proposal.

4. Deregulation, Accounting Flexibility, Personnel

According to the reform, the CNR becomes a corporation with financial and accounting independence. The streamlining and flexibility of the structure are confirmed by means of a criterion of deregulation that allows it to give to subordinate departments, removed by the agency's independence, although subject to the approval of the minister exercising oversight, a multitude of organizational structures, including management, accounting and those of the agency's research departments themselves. CNR's research activities are carried out through departments of its own research network as well as under the conditions of agreements with other agencies, while the character, the organization and management of the agency (institutes, centers, areas, central departmental offices, staff) are regulated by rules determined by the board of directors and approved by the authority exercising oversight. The labor unions are expected to be consulted on the most important rules, which will replace the present ones within 1 year after the law goes into effect, before these rules are examined by the board of directors.

Relative to the rules of operation of an agency that discharges its responsibilities mainly through grants, the subject of a cumbersome bureaucracy becomes evident, primarily because of the difficulty in being able to make quick use of financial resources. For this reason, the new rules of procedure on the budget, the administration, the management of property and oversight are based on criteria of flexibility and streamlining, which are besides predicated on systems in the reform bill similar to those recently approved by Parliament for the new State Railways Agency. The bill provides for the constant checking of the State Audit Court, when applicable, on the management of the agency, even for the purpose of the scheduled reports to Parliament, as well as the control of the Board of Auditors, in accordance with provisions of Article 2403 of the Civil Code.

Specifically, the regulations concern both the formulation and the procedures for approval of the agency's budget (annual and multi-annual), based on the monies appropriated by the State and those earned as a result of its own activities, notwithstanding the statutory requirements by the general accounting of the State, and provisions that guarantee the agency's independent management.

Finally, the CNR reform could not have significant effect unless fundamental changes in the position, the operational system and personnel working relations were involved. Based on this need, the bill contains significant guidelines, which, in essence, are embodied:

a. In those employee relations, which, according to the provisions of the law and with the safeguards involved when public monies are used, are covered by labor union negotiations regarding salaries, rules and anything else involving employee relations in accordance with an up-to-date understanding of professional relations and the taking into account of the regulations covering the entire area of research personnel;

b. In personnel job descriptions in these categories: administrative, technical and scientific and the subdivision of the latter into three levels: according to merit and professionalism, in conformity with substance, methods of recruitment and access that allow the mobility of academic personnel and, more generally, of those engaged in the various areas of research;

- c. In streamlining procedures so as to achieve interchangeability of technical and scientific personnel between the universities and other research institutions by means heretofore never embodied in regulations;
- d. In the possibility, regulated by proper presidential decree [DPR], of lending to private research centers scientific and technical personnel placed on a temporary leave of absence without pay;
- e. In the broad powers to utilize for a specific period of time, under individual contracts, professionally highly qualified personnel available even outside the agency.

In order to provide the necessary correlation between the existing regulations and the results of negotiations within the area of the research personnel of the Civil Service (Attachment 2), the bill permits making use of contracts in accordance with the provisions of DPR No. 68 of 5 March 1986 and later amendments. As a result, the provisions that are incompatible with the new law are abolished and it is decreed that the provisions of Law 70 of 20 March 1975 and those in conflict with Law 93 of 29 March 1983 will not apply as concerns the CNR.

The CNR reform, which is open to constructive improvements during the course of the legislative process, defines the goals related to the promotion of scientific-technological progress in the national interest. It highlights the characteristics of inter-sector and representative participation by the scientific community in the most important non-university research institution of the nation. It introduces standards and criteria for organization, operation, labor relations, qualification and mobility of personnel, promoting a different kind of initiatives on a national and international level that are inspired by steady innovation. In essence, it assumes a spearheading character of the broadest rearrangement within the entire field of scientific and technological research that was called for by the Dadda Commission, created within the Presidency of the Council of Ministers, and to be enacted along with other bills mentioned in the foreword and interconnected in a comprehensive reform process.

Rome, 8 October 1986

9731
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DENMARK RESPONDS TO EC TECHNOLOGY DEVELOPMENT PROGRAM COMETT

Copenhagen WEEKENDAVISEN in Danish 15 Apr 87 p 9

[Article by Lisbeth Skov Larsen: "Danish Response to EC Support for Technology Training: COMETT Will Hurry Up Boundless Production"]

[Text] Danish firms and institutions have reacted promptly to the announcement of COMETT, EC's action program for the development of technology training. New European contacts have been established and existing cooperation strengthened in anticipation of sums in the millions from EC for joint projects. Three very different initiatives with the participation of well known and less known Danish firms are described here.

COMETT is EC's offer of support to firms and educational institutions which work together across national boundaries to develop technologically oriented advanced training.

This offer has obviously come at a very opportune moment for many Danish firms and institutions.

It is not yet known precisely how many Danish applications were received before the deadline for participation in COMETT's first round ran out on 31 March. But at the Academy for Technical Sciences (ATV), which is functioning as COMETT's Danish secretariat, Graduate Engineer Birthe Schouby estimates that there are about 20 major Danish applications.

This is quite a few, when one takes into consideration the fact that the Danish guidelines for what could be applied for to be supported, and how and how much, were first ready in the middle of November 1986. Many applications cover several projects and involve several Danish firms and institutions.

In addition there are applications from individuals for students' practical training positions in other EC countries.

Larger Market

COMETT stands for Community Action Programme for Education and Training for Technology, the community's action program for technological education and training. It is to run for three years and it is estimated that it will cost

EC a total of about 350 million kroner. Support can be granted for up to 50 percent of expenses for each project within the maximum limits, in three out of four project areas, or "strings," as they are called in COMETT. Support for room and board for practical training will be granted in accordance with special rules. The application deadline for the next round is 1 July 1987.

New technology is making it necessary to update constantly and quickly technical training in particular. But new technology has also provided new opportunities for doing this. European cooperation in the development of technological training was in progress or on the way already in many places, with the goal of saving time and money and ensuring a larger market.

The Consortium

The Consortium is a preparation for European cooperation of this sort. It was arranged, even before COMETT was adopted, between six Danish firms and institutions, which thought that together they could both save on travel expenses for meetings around Europe and gain greater impact in international contexts.

The six are the Jutland Open University, Jutland Telephone, Arhus Technical School, UNI-C (University Electronic Data Processing Center), Jutland Technological Institute, and DIEU (Danish Engineers' In-Service Training, an independent firm whose board of directors comes from the engineers' associations, technical colleges in Denmark, and the Danish Technical College).

Together they have applied to join string A, which has to do with training partnerships between universities and firms. Their projects are to the effect of developing various programs for remote teaching in cooperation with B&O, Standard Electric Kirk, IBM Denmark and Brue & Kjaer, among others.

Learn on the Job

In addition, individually and together they have sought approval of a number of subprojects in string B, which has to do with the exchange of staff members and students, string C, which has to do with the development and testing of educational material for more advanced training, and string D, which has to do with multimedia training systems for new technology. They already have partners in other EC countries in several of the subprojects.

Several of the consortium's members are already engaged in remote teaching. DIEU has a course in the Pascal programming language in progress at DTH [Danish Technical College], on the basis of the same principles being used in a computer conferencing system at Arhus Technical School. In this course, the students first meet for a couple of lectures. Then they solve their problems on a computer at their place of work and send the solution via the telephone network to the teacher's computer. He corrects and comments on the assignment and returns it the same way.

But the participants can also "whisper to each other in class" along the way. For they can ask one another via computers and the telephone network for advice on how the problems can best be solved.

Multimedia Teaching

In December 1986 Jutland Open University entered into a contract with IBM whereby IBM will make 22 million kroner worth of computing equipment available for Jutland Open University's development of a computer conferencing system and for testing of the result in concrete teaching. This contract runs through 1987 and 1988, i.e., the first two COMETT years.

The project concerning a multimedia teaching system, presumably centered at Arhus Technical School, and for which the Consortium is now applying for COMETT money, will make it possible to test the principles of those projects in progress which overlap and complement one another. And the project can become much broader, because the Danish firms in the partnership have experience in and knowledge of various media, including video, and of new communications paths, including the broadband net.

If all the Consortium's projects are approved, it and its members and partners will get eight-figure support, in kroner, from EC over the course of the three COMETT years. In addition, there will be a number of European contacts which the participants would have had difficulty in establishing by themselves. For them COMETT can become a push forward at the right time in a European joint effort which they were in the process of establishing.

Several Years Saved

European cooperation is not new for Svejsecentralen [the Welding Center] either. But an organization of about a dozen European welding institutions has seen in COMETT a chance to save several years of the time that otherwise would have gone toward communicating important research results all the way to those who must use these results in practice.

The European welding institutions have agreed on and divided among themselves a number of projects, each of which is to be developed in one country and tried out in others.

Svejsecentralen is in Brondby near Copenhagen with divisions in Esbjerg and Aalborg. It is an ATV institute engaged in research and development and in communicating knowledge to industry.

Svejsecentralen trains welding technicians and welding engineers, for one thing, and it is the Nordic center for the training of welding inspectors, i.e., the people who are to prevent accidents by checking that welds in bridges, cranes and gas pipes, among other things, are OK.

Next Round Too

The COMETT project which Svejsecentralen is participating in in this round has to do precisely with the development of programs for training specialists at

the highest level in welding inspection. They will get their knowledge directly from research centers. It is a question of just a handful of people in Denmark. But it is they who are to train the next link in the system: the teachers who must enable welding inspectors to utilize the latest developed methods for inspecting welds.

In this round Svejsecentralen in Denmark is taking part only as a subcontractor for a subproject concerning a single inspection method, i.e., the ultrasonic. The prime mover for this part of the project is a Spanish welding institute, and there will probably be West German participation too.

But in the next round Svejsecentralen is expecting to come in in the CAD/CAM (Computer Aided Design and Computer Aided Manufacturing) field, and to receive the primary role in the part of the project that particularly has to do with teaching robotization in welding.

A Career

Informatikcentret A/S [the Computer Science Center, Inc.] has put its name down for a third of the possibilities residing in COMETT. This is a three-year-old Arhus firm with around 25 employees and a branch in Frederiksberg next to Copenhagen. Originally it offered just in-service training in computer science. Now it sells "any form of in-service training in demand and relevant" besides consulting assistance and other forms of knowledge.

Its managing director is Candidate of Social Sciences Knud Kristensen--a former student council chairman at Arhus University, the man behind several studies of students' living conditions, a university lecturer in public law, and finally administrator of the Social Sciences Faculty Administration, before he founded Informatikcentret in 1984.

Informatikcentret has a partnership for one year with a Belgian firm which happens to have the same name, but in French: Centre de Informatique. It is located in Liege and is a firm which is part of the Fabrique Nationale industrial concern. The partnership has to do with the development of programs for in-service training, both in the use of new technology and by means of new technology.

European Network

When COMETT was announced, these two firms saw an opportunity both to bring their partnership in under COMETT and to involve some institutions of higher learning in the further development and testing of their training systems.

The Belgian firm entered into a cooperation agreement with Liege University. Informatikcentret entered into a cooperation agreement with, among others, Odense University, and is calling it the Jutland-Funen Training Partnership. The Belgian and Danish partnership then joined a network of similar partnerships in other EC countries, called COM-Net, which stands for COMETT Network. COM-Net's declared goal is to realize some of COMETT's intentions. The participants have bound themselves to accept each other's students and

personnel under an exchange arrangement and to present and join projects which firms in the partnerships of other countries will try out.

Special "Memory"

Informatikcentret, together with Centre de Informatique and a software house in Madrid, has submitted a project concerning "Self-Taught Computer Science Training." Informatikcentret is to develop the possibilities in the new storage techniques in personal computers utilizing compact disks.

The idea is to make reference programs for accounting personnel, technicians and other special fields. They will be able to be installed in a personal computer as a non-erasable memory. In the middle of an involved account or a complicated design, the user will be able, with a single keystroke, to go directly into the section of the reference program he needs, and with another keystroke to return to the point he had come to in his accounting or his design.

This part is to be tested at Liege University and at the polytechnical college in Madrid. In return, simulation programs, which Centre de Informatique is designing in Liege, among other things for training machinists in the use of computer-controlled lathes, are to be tried out in Denmark. This can take place, for example, at Odense Technical College in training technicians and engineers, and people at Odense University with experience in computer-assisted foreign language learning can concomitantly test whether the method answers its purpose and fulfills Danish requirements for the quality of the training.

The EC support for the projects Informatikcentret has submitted for the present can become 1.8 million kroner, plus financial grants for staff members who participate in exchange programs. In addition there is the firm's opportunity to have its products tested and to market them internationally.

The Ball Rolls On

Informatikcentret's development head until 1 April, Per Overgaard Nielsen, is a cand. phil. [B.A.] in history with Latin American countries as his specialty. He has also been a member of the administration at Arhus University, i.e., as head of the central student adviser's and vocational guidance office, until he let himself be "privatized" two years ago by Knud Kristensen.

Now he is the newly inaugurated head of Fredericia Training Center, an independent institution that is still on the drawing board and was founded by the Municipality of Fredericia together with firms in the area in order to ensure forward-looking in-service training in that part of the country.

Before Per Overgaard Nielsen said yes to his new job, he got both his employer's at that time and his new employer's word that they would like to see Fredericia Training Center join COMETT projects in partnership with Informationscentret [the Information Center]. This can take place, he imagines, when the training center, in August in its own new home, can make

available offices, facilities and what he calls by another fine Modern Danish word "brainware."

There are lots of possibilities for good contacts in the network of European firms and training centers which he himself has taken part in establishing with a view toward COMETT. Per Overgaard Nielsen would like to offer them the Fredericia region's firms and schools too.

8831
CSO: 3698/460

FRG: TECHNOLOGY SYMPOSIUM IN TAIWAN TO PROMOTE COOPERATION

Duesseldorf HANDELSBLATT in German 25 May 87 p 14

[Article by SM, "A Technical Symposium Next May Designed to Facilitate Trade with Taiwan; Republic of China Economic Delegation Explores Opportunities for Cooperation"]

[Text] Bonn. In the next few years Taiwan will invest several billion DM in environmental protection measures. Besides this, the Pacific nation has placed the development of communications and local-area transportation systems high on their list of priorities. At the present time an economic delegation from Taipei is traveling through the Federal Republic in order to sound out the possibilities for cooperation with German companies.

[Christian Socialist] Union party representatives Hans-Heinz Hauser and Hermann Josef Unland, who met with the economic delegation, have committed themselves to expanding the economic relationships between the two countries without endangering political relations with Beijing. Hauser explained that the German economy can expect sales orders [as a result of this development], which would have a favorable effect on the German labor market.

He greeted the intention of the German Conference on Industry and Trade and the Federal Association of German Industry to conduct the first German technical symposium in Taiwan in May 1988. The visit of the Taipei delegation under the leadership of the chairman pro-tem of the Taiwan Council for Economic Planning and Development, Wang Chao-Ming, is also designed to prepare for this symposium.

In the next few years Taiwan also wants to invest in areas in which companies from the Federal Republic can offer top technological performance. Taiwan has access to foreign exchange reserves of approximately 57 billion US-dollars, with 4 billion US-\$ in overseas debt. In the past year, the Federal Republic exported goods valued at almost 1.2 billion DM to Taiwan; German imports amounted to just 1.3 billion DM.

In the Federal Republic, the Taiwan delegation is specifically checking out possible cooperation with German companies in expanding the island's commercial information and communication system, as well as local area transportation techniques. They are paying special attention to environmental protection techniques. Due to progress being made in industrializing the country,

massive efforts to improve the quality of life are necessary, for which the government wants to spend over 50 million DM in the next ten years.

The delegation from Taipei presented their discussion partners in Bonn with a list of planned projects for fighting environmental pollution:

- o In order to cut down on water pollution, Taipei, Taichung, and Tainan are supposed to improve their water treatment system to the tune of 147 million dollars. 25% of this amount is earmarked for constructing sewage treatment plants. 75 million dollars are supposed to be invested in receiving basins for the Tamshui and Keelung Rivers; the estuary of the Chi-Shui River is slated to cleaned up for 20 million dollars.
- o The government wants to invest 2.9 billion dollars for air purification equipment at government facilities alone in order to meet the requirements of emission regulations that go into effect in 1990 and 1993. An air pollution warning system is to be created for 12 million dollars.
- o Within the framework of a community garbage disposal program, 23 incineration plants are going to be built with a total daily capacity of 8,600 tons; they also intend to build 55 regional landfill dumping sites.
- o In addition to these efforts, they also plan to spend 59 million dollars for three high-temperature incineration plants for the disposal of special wastes from nationalized industrial areas.

13127
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GDR RESEARCH IN ORGANIC CHEMISTRY

Anniversary, Accomplishments of Institute

East Berlin SPECTRUM in German No 2, 1987 p II

[Report on the message of greeting of Academy of Sciences ordinary member Gerhard Keil, head of the Chemical Research Division of the Central Institute for Organic Chemistry: "15 Years of the Central Institute for Organic Chemistry"]

[Text] On 12 December of last year the Central Institute for Organic Chemistry (ZIOC) celebrated its 15 years of existence with a festive colloquium at Robert Bunsen Hall in Berlin-Aldershof. In the presence of numerous guests, including those from the industrial combines with which the institute has had cooperative relations for a long time, ordinary academy member Siegfried Nowak, director of the Central Institute, made an impressive stocktaking covering this period of time; subsequent to this, leading scientists presented their main lines of research.

The message of greeting by the head of the Chemistry Research Division, Prof Gerhard Keil, was received with particular interest.

After a short retrospective review of the founding stage of the Central Institute 15 years ago, in which very productive and highly-specialized capabilities were brought together and organic chemistry was again given a firm place in the research of the Academy of Sciences (AdW), Prof Keil dealt with achievements and stages of development of the institute. He paid tribute to the important contributions to scientific breakthroughs on an optimal material-economy utilization of petroleum, as well as on the scientific-technical foundations of the thermal and catalytic conversion of petroleum fractions and of individual hydrocarbons or the results on the kinetics and mechanism of thermal cracking and coke formation.

"I would like to emphasize," said Prof Keil, "that for the sake of putting into effect central resolutions on synthesis-gas and methanol chemistry, important personnel, research-technology, material-technical, and scientific-design prerequisites have been created in recent years by this team, and

it has proved possible to achieve initial research results; in fact, this has always been done with the goal of doing more with what is at hand.

"The working out of scientific foundations for the upgrading of basic organic materials and intermediate products has concentrated increasingly and successfully on the synthesis of bioactive compounds such as plant-protective agents, human and veterinary drugs, animal-feed additives, and surfactants. This has led to new products and new methods of synthesis, or else to more efficient synthesis paths for introduced products. At the same time, in doing this basic information on the course of organic reactions could be obtained and discoveries about the structure-effect relations and relationships among properties could be deepened."

He said that this scientific advance work is the basis for a series of outstanding research achievements with bioactive materials and surfactants, with these research results having been introduced or scheduled to be introduced into production. In selected areas of polymer chemistry, the institute team has contributed to the syntheses, mechanisms, and control of polymer formation reactions, he said. By making use of the great variability of polyurethanes, the team succeeded in developing important special polymers, which have been introduced into production in close cooperation with Schwarzheide. For microelectronics as well, significant things have been worked out, he said. "Since the beginning of the microelectronics program in 1978," said Prof Keil, "considerable capacities of the ZIOC have been concentrated on the handling of research and development tasks, among other things in the field of radiation-reactive polymers for lithography in microelectronics, and thus here also we started with the utilization of what was on hand. The successful handling of these tasks within a short time was possible because we were able to use knowledge and experiences from sophisticated basic work on free-radical polymerization, which were applied in a concrete materialization of our time-tested 'harmonization strategy' in the development of optical components and optical adhesives in the 1970's."

Prof Keil stated further that one of the important tasks of the AdW is to coordinate basic research in the field of chemistry closely with the universities and colleges of the GDR and to frame and orient it over the long term in harmonization with the research institutions of the chemical industry, in a manner corresponding to the economic requirements and the development of science. This takes place above all by way of the chemistry research program. Ever since its founding, the Central Institute for Organic Chemistry has professionally supported this important task and has fulfilled it with great commitment.

In discussing future tasks, Prof Keil said:

"Significant tasks are facing organic chemistry in connection with realizing the resolutions of the 11th Party Congress. Above all it must make important research contributions toward the development and application of this key technology for the sake of a further intensive development of our economy. To an increasing degree and in growing number, upgraded special products--

including a multitude of organic-chemistry products--are becoming the indispensable prerequisite for the development and utilization of the key technologies. Advanced research work is required above all in the area of organic synthesis. Through ever new or varied syntheses, adapted to a wide variety of application products, organic synthesis chemistry creates important prerequisites for the upgrading and efficient utilization of domestic raw materials.

"The concurring assessment by the Council on Basic Research Orientations was that in the next few years the augmentation of usable chemical knowledge will take place to an increasing extent through work on preparations and syntheses. What is to be striven for is the development of new classes of substances and materials, since above all these provide the guarantee of breakthroughs and of making available new commercial products. Moreover, the elaboration of methods of synthesis that correspond to the growing demands for new types of products from the chemical and non-chemical industry are taking on a key role. To an increasing degree, synthesis is even becoming determinative of the pace of advance--compared to the separation of materials and chemical analysis."

He said that worldwide a trend is emerging toward the increased use of natural substances as a basis for organic-technical products. Today, one area of main effort is the carrying out of syntheses under gentle conditions and also with the use of regular processes occurring in nature or that imitate natural processes. This means also the inclusion of microorganisms and enzymes as "aids to synthesis" for the chemist. Biotechnology is one of the most interesting growth fields for the coming years, he said.

After that the speaker suggested that important problems in the creation of scientific advance work must be solved for the sake of a more intensive and optimal use of domestic raw materials, especially the utilization of brown coal and imported petroleum. The same things are true also of the development of polymeric industrial materials. Here also, the institute team can count on a solid scientific and material basis that it has created for itself over the last 15 years, he said.

Comments of Institute Director

East Berlin SPECTRUM in German No 3, 1987 pp II-IV

[Interview by Ilka Renneberg with Academy of Sciences ordinary member Siegfried Nowak, recently director of the Central Institute for Organic Chemistry and new head of the Chemical Research Division: "Successful Strategy of the 'Harmonization'"]

[Text] [Question] Prof Nowak, for 13 years you headed the Central Institute for Organic Chemistry (ZIOC), which recently celebrated its 15th birthday. It was established in 1971, when several institutes and sectors were merged. Why had this step been necessary at that time?

[Answer] The hour of birth of our Central Institute coincides with the holding of the 8th Party Congress, which set the task of combining the achievements of the scientific-technical revolution in an organic way with the advantages of the socialist economy.

Science as a decisive factor in the further growth of the economy was to be associated more closely with production, and the quality of the planning, leadership, and organization of science itself was to be improved. Therefore the integration of the Academy of Sciences with its great research potential into the economic reproduction process had become imperative and urgent. It was essential to orient the scientific capabilities of the academy to a greater extent than hitherto to current and prospective tasks of our economy, in addition to its acquirement of fundamental knowledge. This concentrated and increased attending to economic focal points made the formation of larger research units objectively necessary, above all by way of bringing together smaller research institutes.

[Question] This approach was surely not easy. With what problems did the institute's leadership have to cope?

[Answer] The bringing together into a unified whole of disciplines whose development and tasks differed considerably from one another, the overcoming of certain discipline-related egoisms, the mutual professional dovetailing of these disciplines, the formation of sound research emphases, and the economic and material-technical provision for the research process for such a large structural unit presented us all with manifold and new tasks.

Also there were no experiences on managing such a large research collective. We owe it to the exemplary commitment of many comrades and colleagues, who under the leadership of the SED quite soon began to do responsible and constructive work at the ZIOC, for the fact that it proved possible to successfully solve these problems.

[Question] The institute is a productive and respected partner for our industry. What problems had to be overcome in order to build a good partnership that was also in keeping with the new research ordinance?

[Answer] I believe it is essential to remember that ever since its founding the institute was able to count on good traditions of an efficient industrial association, which had been cultivated in the precursor institutions by such outstanding personalities in science as Eberhard Leibnitz, Heinrich Bertsch, Alfred Rieche, and Alfred Wende.

A decisive precondition for the successful development of the institute in the last 15 years has been and is our close cooperative relations with industry, especially the chemical industry. We achieved effective cooperation in elaborating predictive-analytic assessments on a long-term basis, in coordinating developmental concepts of the combines, in the planning and execution of research projects, as well as in the joint introduction into production and the utilization of the results. Many tasks were worked out in a process of close cooperation based on a division of labor.

Also of high economic benefit was our participation in process analyses in the chemical industry. Let me mention here just the successful cooperation with the Buna Combine on low-pressure polyethylene synthesis, on hydrazine synthesis at the Leuna Works Combine, and the effective participation in the process analysis done by the pyrolysis complex in Boehlen and in the startup of the cracking and aromatics compounds complex at the Schwedt Petrochemical Combine.

[Question] How is the cooperation of your institute--now your former institute--organized with Berlin combines and enterprises?

[Answer] Among our Berlin partners are the combines of plastics-elastomers processing, of cosmetics, of construction of means of rationalization, and of paints and varnishes, the Koepenick Photochemical Works, and the Berlin Chemistry VEB. We view our task as lying in strengthening the productivity of the Berlin enterprises.

The central concern is the creation of scientific advance work and the introduction of results into industry. Focal points in this cooperation with Berlin enterprises are polymeric industrial materials, especially for the fields of electrical engineering/electronics/microelectronics, surfactants, and drugs.

With the results on radiation-printing varnishes for microelectronics worked out by us and jointly introduced into production, the ZIOC was able to make a respected contribution to the development of this key technology. In the development of cooperative efforts with industry, participation in inter-enterprise socialist working groups and the sending of colleagues into industrial outfits have proved their worth. Thus, more than 60 stays in industrial outfits with a duration of from 1 week to several months were completed just in the last 5 years by our fellow workers. We have participated in collectives for product introduction and in startup collectives and have tested our results in small-scale test facilities at industrial outfits.

[Question] The ZIOC has also made outstanding contributions to our agriculture and pharmaceutical industry. In what fields is the work concentrated here?

[Answer] At the center of attention is the synthesis of bioactive compounds, such as plant-protective agents, human and veterinary drugs, and animal-feed additives.

Some outstanding results that have been introduced into industry from already traditional organic phosphorus compounds research are the development of a synthesis path for the active ingredient of the growth regulator "Camposan" and the contribution to the plant-protective agent Filitox. It is not without pride that we can note that three of our colleagues were included in the two collectives distinguished for this by the National Prize.

Other outstanding results are Coligon P--a cleaner for greenhouse roofs-- and an efficient manufacturing path for an initiating product for the

vasopressor "pholedrine," with a high material savings amounting to 5.4 million marks in the year of its introduction.

In order to avoid lapsing into mere enumerations here, I will mention further merely the total synthesis of the prostaglandin analog "cloprostenoil" for streamlining animal production and for the treatment of certain cattle diseases. One important result of our academy-industry complex on organic syntheses founded in 1979 in Bitterfeld is that of the animal-feed additives Bisergon and Bisergon SP 10.

[Question] What scientific foundations have been created at your institute for a greater refining of raw materials such as petroleum and brown coal?

[Answer] This has formed a special focus of research in the last 15 years. Outstanding results in the field of heterogenous catalysis include the creation of the scientific-technical prerequisites for the joint development with Leuna and Schwedt of a high-performance catalyst for the low-pressure reforming of gasoline fractions within the framework of an inter-enterprise socialist working group. The catalyst that was developed and that has now been used on an industrial scale is a top-quality product by international standards. This achievement was acknowledged in 1986 with an awarding of the National Prize.

The research work on the pyrolysis of hydro-cracked alkanes is an important prerequisite for the replacement of crude gasoline for olefin generation. With this work and with the results on the catalytic transformation of high-boiling mineral-oil fractions and residues, we are contributing to the deepened material utilization of imported petroleum whose direct burning we simply cannot afford. With high-boiling petroleum fractions that have been pretreated hydrocatalytically, there was a successful conversion of the manner of olefin generation in 1986 at the Leuna Works, and the same thing will happen at the Boehlen Combine in 1987/88. In the field of olefin production, the GDR occupies a top-ranking position internationally. For this top-quality result, in 1986 the National Prize was also awarded to a team from the ZIOC. Great efforts by our institute team are directed toward fulfilling the governmental order on synthesis gas and methanol chemistry by means of outstanding achievements. The emphasis here is on the conversion of domestic brown coal via synthesis gas and methanol into oxygen-containing intermediate and final products, into olefins and aromatic compounds that at present are still being made on a petroleum basis.

[Question] The ZIOC is one of the institutions of the academy with the most inventions. Why is this the case?

[Answer] With 455 patent applications for inventions--including applications by industry--for the period from 1981 to 1985, in fact we are not doing badly, even when one relates this figure to applications per 100 university cadres.

In my opinion, three points are decisive in this connection:

Firstly, a correct orientation in setting research goals--which means that the proper high-quality tasks must be formulated.

Secondly, even in the initial defense to justify including a project, when the research work is begun, a patent right policy concept is already in place, in which questions of the level of international developments are unequivocally and clearly answered.

Thirdly, the workers at our Central Institute have the right attitude to these questions.

Quantity is an important factor. But I regard as decisive the quality of the patents and the number of inventions used in industry. Here we have very good results to show, especially in the last 5 years.

[Question] Then you surely also have a "patent for success" that you could offer to other institutes for their subsequent utilization....

[Answer] No, unfortunately--or luckily?--we do not have such a patent, but only our experiences. Thus we have succeeded in developing a profile that corresponds increasingly better to the economic focal points and ensures a long-term advance in knowledge. Contributing not least to this have been our close associations with industry. We have attained economically important scientific achievements in just those areas where the work was geared to the long term and where high-quality basic research was practiced.

It is important that before a start is made on a research topic the tasks and the goals are correctly formulated, that a capable working team is on hand, and that the leaders and workers approach the work in a committed manner.

[Question] If one attends to your statements, he comes to the conclusion that the development of the ZIOC has proceeded quite without any problems. Is that correct?

[Answer] That is true in principle, although the formation of a new research unit of such a large size always entails problems of an organizational, technical, and also ideological nature. The Central Institute for Organic Chemistry of 1986 is no longer that of 1971.

Manifold problems had to be solved for which there were no experiences. Thus an expanded profile also led to new structures and obligations. Since in this process we are always dealing with human beings who must face up to the new requirements, it becomes clear that personal interest does not always harmonize with the objectively necessary changes. In spite of this, the institute leadership was able to solve all the problems facing it to the best of its ability, in close cooperation with the social organizations.

[Question] We should also say something about polymer chemistry, whose products meet us at every turn--from imitation leather to microelectronic circuits. Have new developments taken place here?

[Answer] Considering the need to keep these statements brief--because this is not supposed to be a full activity report--I will say only this much: Our institute team was able to come up with practical achievements in terms of extensive improvements in the areas of polyurethanes, thermostable polymers, and polymers for electrical engineering/electronics/microelectronics. In addition to material-oriented synthesis activities and work on characterizing selected polymers, important discoveries on structure-property relationships were also achieved and contributions were made to the theory of network polymers and to methodological developments.

I would like to emphasize the results in the field of polyurethanes. Here it proved possible to take advantage of the great variability of polyurethanes to develop improved special polymers. This was helped along by investigations on the course of the isocyanate reaction as well as by extensive physics investigations on polymeric industrial materials.

Examples of the great practicality of polyurethane research are the development of a coating system for dialysis cells used with artificial kidneys and a variant of a polyurethane reactive system for the production of imitation leather. The stage of test production has likewise been reached in connection with a polyurethane membrane system for ultrafiltration, which is being used primarily for separation problems in aqueous media.

Significant contributions have been made in the field of polymeric industrial materials and auxiliary materials for electrical engineering/electronics as well as microelectronics. This applies to both practical solutions and scientific advances. I might mention the development of printed circuit boards, especially with respect to making them flameproof, and the development of thermostable polymers. An example of this is polyquinoxaline, which for the present is being produced for industry at the ZIOC just on a laboratory scale. This thermostable product has manifold possible applications--thus, for example, for the manufacturing of electronic components and extending as far as the production of diamond grinding wheels.

Important contributions to microelectronics as a key technology are being made by the institute team above all with the development of radiation-printing varnishes for lithographical techniques in microelectronics. A positive resist system developed by us for making microelectronic circuits is being produced by the Koepenick Photochemical Works.

[Question] Prof Nowak, on 1 March you were appointed to be the head of the Chemical Research Division. The editors very warmly congratulate you on this appointment.

We would like to follow this up with the last question of our interview. What experiences do you bring from your many years of activity as the director of the institute into your new function as head of the research division?

[Answer] As head of the sector of "basic organic materials" in Leipzig, in addition to my technical work on petroleum chemistry I had to instruct

teams and to organize the scientific work. Since 1971 I have been the deputy director in Berlin and later the director of the largest chemical institute at the academy. Here there was an opportunity to gain manifold and valuable experiences in leading large teams. I believe that it is important for one to become directly acquainted with the process of research, to be capable of motivating and leading teams, and to have a grasp of a wide research field. Moreover, for many years I was the academy's representative to the chemical industry for combines, at the Bitterfeld Chemical Combine, and I am a member of various research groups in the GDR.

All this will help me to cope with my new tasks. Moreover, I am certain that the directors of the institutes and the entire team of the research division will be supporting me in my new function.

12114

CSO: 2302/35

COMPUTER SALES FORECAST SCALED DOWN

Sao Paulo GAZETA MERCANTIL in English 20 Apr 87 p 6

[Text]

The return of high inflation rates and difficulty in obtaining imported components point to a rough year for the computer industry. Yet despite complaints about the uneasy economic environment, computer makers are still counting on double-digit sales growth rates.

Sid Informática S.A., the second-ranking maker of medium-sized computers owned by the Matias Machline group, has slashed this year's sales growth forecast from 60% to between 20% and 30%, due to high interest rates charged on loans to potential buyers. Sid president Antônio Carlos Rego Gil says the computer industry's ability to invest has been hit by the unlikely combination of high inflation, which raises costs, and a drop in prices for computers, caused by intense competition. Last year, the computer industry cut prices on average by about 25% between February and December, he says.

Scopus Tecnologia S.A., the second-largest personal computer maker, expects sales to grow 17% this year over last year. Nevertheless, vice

president Josef Manasterski is worried about the impact of the suspension of interest payments on the foreign debt declared February 20, which has drastically reduced import financing by foreign banks of crucial inputs.

The Elebra group, which controls the leading peripherals maker of the same name, reports that last year labor costs rose 40 percentage points above the group's overall costs. Despite the cost increases and the price freeze, Elebra earned a profit of the equivalent of \$3.1 million on sales of \$117.2 million.

The group's microelectronics division signed a five-year licensing agreement Monday with Intel Corp. of the U.S. to manufacture part of integrated circuit chips used in computers and telecommunications equipment. Elebra, which has marketed Intel's chips since 1985, will pay the U.S. company for each product and each technology transfer, avoiding the touchy issue of royalties, according to José Ellis Ripper, president of the division.

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CSO: 3699/69

NEW EXPERIMENTAL PHYSICS LABORATORY ESTABLISHED IN CAMPINAS

Brasilia AGENDA CNPq in Portuguese Mar 87 p 3

[Text] It has been planned, in March, to begin construction in Campinas (Sao Paulo) on the National Synchrotron Light Laboratory (LNLS), the most modern experimental physics laboratory in the country and the first one to be opened to researchers from all areas and institutions. The announcement was made by the science and technology minister, Renato Archer, at the swearing-in of the members of the laboratory's board of directors on 19 February, in Brasilia. Among those attending the ceremony was the 1985 winner of the Nobel prize in physics, Klaus von Klitzing, and the head of CNPq [National Council for Scientific and Technological Development], Crodowaldo Pavan.

The laboratory, to be constructed by the Ministry of Science and Technology, through CNPq, and with the participation of several universities, will be used primarily for basic research on materials and for the industrial-scale production of highly integrated electronic circuits.

With a cost estimated at \$80 million, the laboratory is intended to go into operation in 1992. Meanwhile, in 1989 it will be possible to have a source of intense infrared radiation, and a free electron laser, built using the LNLS pre-injection linear accelerator.

LNLS' main equipment consists of an electron storage ring. Upon circulating through the ring, these electrons emit high intensity light, with space and time features that make it a powerful tool for materials analysis. In the case of the Brazilian project, this light will be mainly in the ultraviolet and X-ray region.

Brazilian Project

In addition to giving an impetus to Brazilian experimental research, the laboratory will have the mission of contributing to the national technological development; inasmuch as it will be designed and built in Brazil, with a minimum of imported equipment. It is important to stress that, at present, the great interest that the synchrotron light is arousing has caused it to be virtually impossible to seek personnel abroad for its construction.

LNLS will be a national laboratory, that is, its research facilities will be open to all researchers, engineers, and technicians who are qualified to make use of them. The national industry will be involved in all phases of the design, construction, and maintenance of the laboratory. Brazilian business firms will also have access to the facilities, to implement projects involving research, development, and training of human resources; and they may also make contracts with the laboratory for the rendering of services.

Integration

According to Minister Renato Archer, the return on the investment will be quick, because the facilities will also be used by researchers from state and private enterprises. But the most important aspect is that, since it is an open laboratory (the researcher needs only to send the project and a request for machine use time), there will be greater interaction among the Brazilian scientists working on different projects on the same site.

The presence of a national laboratory of a multi-discipline type, in which chemists and biologists, materials engineers and physicists, and electronics and software technicians are working side by side, will act as a powerful incentive for informal inter-disciplinary coooperation which, as the experience in other countries has shown, considerably accelerates the progress of science and technology. This inter-disciplinary quality is virtually non-existent in the universities and research institutions, where the geographical compartmentalization ends up creating an intellectual compartmentalization.

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CSO: 3699/67

REVIEW OF BRAZILIAN ROBOT MARKET, MANUFACTURERS

Sao Paulo MAQUINAS E METAIS in Portuguese Feb 87 pp 22-32

[Text] Some manufacturers are slowly perceiving that the demand is not as significant as had appeared; and others are struggling with paperwork and many meetings with the SEI in order to be able to begin manufacturing. That is the picture of the not yet well-defined robot market in Brazil. It is a market that has already discouraged one company to leave the race but that, on the other hand, has encouraged manufacturers foreign to robotics to begin a tireless battle for the green light from the SEI.

Does Brazil need robots? After all, there had been an expectation of sales of 60 units in the domestic market last year and about 90 in 1987. But last year, less than 30 systems were marketed, and with the current economic uncertainty it is difficult to forecast if this number will be surpassed this year.

Almost all of these robots--understood here as complex systems and not simply manipulating arms--were consumed by the automobile industry. "This segment emerged with the euphoria of the decreeing of the informatics law and the needs of the auto industry and not the overall needs of the market," said Julio Cesar Camerini, one of the directors of Mixertech, a manufacturer of triaxial manipulators.

The most complex robots are being applied to spot and arc welding; but who is actually serving the auto manufacturers? DF Vasconcelos, with ASEA technology, Villares Digital Electronics, with Hitachi technology, and Ipsos, with Reis technology. It should be noted that only companies with transferred technology are in that sector.

For this type of application, only the companies with foreign technology succeeded in filling the need, even so with very low levels of nationalization, which is called for in the projects approved by the SEI.

But what of national technology? Most of it is in the embryonic stage, but with certain progress. The most promising niche is that of manipulators, that is, less complex systems applied in transporting and handling parts, and painting. Such is the case of Servus, BCM, Mixertech, EB, Atos, among others.

Many are already letting themselves be disheartened by negativism, particularly with the temporary departure of Mentat from the market; however, the market exists. In addition to the 16 companies approved in June 1985, others want to vie for their terrain. MAQUINAS E METAIS (MM) sought to hear from the companies that received or did not receive SEI approval, and also the new companies.

It has been ascertained that the market is depending on a better definition of the economy. Camerini of Mixertech believes that "the outlook prevents planning for investment. There is an expectation of an increase in the cost of manpower and changes of automation strategy are perceived that make impracticable any forecast for robotics, which must remain at a secondary level."

The main sectors for the application of robots are the automobile industry, auto parts, and the industries associated with leather. "Most of the applications of robots are aimed at maintaining quality, stimulated mainly by export contracts," believes Alberto Zucchetti, the technical manager of UPM, a company that manufactures manipulators and automation systems. According to Zucchetti, who at one time was a technician for Comau in Italy, many factors can stimulate application: from union problems, unhealthful conditions, and quality, to the cost of manpower. "There was a growth of robots in Italy due to union problems," he recalls. In Brazil, because manpower is relatively cheap, it discourages that use. "Its utilization here seems to be related to quality for export, and to unhealthful conditions," commented Zucchetti.

"Despite the problems, we need to modernize our park and export. Automation is basic for that," declared Thomas Lanz of the Brazilian Numeric Control Association (Sobracon). There are many difficulties for the development of technology: lack of appropriate manpower, lack of components and materials, and even of an automation philosophy. "The industries are not very familiar with automation but it is a sector in the process of transformation and we need to prepare ourselves," declared Jose Luiz Bozzeto, the director of BCM.

"Manpower training is our main problem. Many companies in the automation sector were forced to retard their development because of this. All of them are engaged in training but we need greater incentives for the universities, technical schools, and research institutes to fill this deficiency if we want to occupy a better position in the international setting," complained the president of Sobracon.

From this viewpoint, there is much information about robots. There is a bigger market for more simple manipulators and not spectacular androids. Do we have the skills? By showing each company's stage of development and the overall market situation, MM wants to provide a closer idea of what is actually happening.

One of the First

One year ago, Servus Technology and Informatics surprised the market with a servo-hydraulic robot. The stage was the 16th National Mechanics Fair, an event at which other robots were also paraded: Mentat's deactivated robot, with Siemens technology; the televiewing RV 6060 of Villares, with Hitachi

technology; Ipsos', with Reis technology, shown in Ferbate's stand; the Orbital 600 of EB Projects; and Petersen's; while the Romi injector division presented a system of pneumatic manipulation and BCM was prominent with the first version of its six-axial robot for painting.

The major part of Servus' sales is based on the production and marketing of servo-hydraulic test and trial machines, coupled to microcomputers, transducers, and with application software. One of its customers, Nakata--an important shock absorber manufacturer and user of Servus test machines--ended up becoming its partner, with all of the mechanical part of this first robot being built in Nakata's machine shop and the valves acquired from Rexroth. But the brains came from Servus itself.

Today, this robot, designated SR1, is working in the handling of parts in the shock absorber factory in Diadema; but before reaching that point, Servus experienced significant difficulties regarding components. This led to the development of high-resolution rotary transducers known as encoders, which serve not only the robot market "but principally that of machine tools," revealed Denys Nicolosi, technical director of the company.

"The fact of having our own technology over the years gave us the security to face new challenges, something that is common in the robotics area, where what matters is the overall solution for improvement of efficiency of a process and not merely the installation of an isolated system," declared Nicolosi, referring to the effort expended to overcome the difficulties, which resulted in new products.

Agreements

"We have not mastered many manufacturing processes and many times it is necessary to join someone who has," said the technical director of Servus, to explain the agreement signed with Kopperschmidt-Mueller, a traditional manufacturer of painting equipment.

It can even be said that this deal was born under the intense heat of the Anhembi Pavilion during the last Mechanics Fair. The reason is simple: Servus and Kopperschmidt occupied neighboring stands and that proximity facilitated the blossoming of the idea of a robot for painting, since hydraulics is the best method indicated for this type of application because it avoids explosions.

The result should be the so-called SR2, for painting and the application of PVC. The company has not yet revealed the details but it is going to be launched this month.

Even before the publication of this agreement another was signed between Servus and Villares for the production of a robot that aims to be a mixture of technologies, mainly in relation to the control part since Villares has a transfer agreement with Hitachi.

"But where is Villares?" Nicolosi asked early this year. "We concluded a cooperation agreement and our partner still owes us a report on applications.

Servus' dissatisfaction is justified because it has been waiting for Villares' position for over 4 months."

Villares Consolidates Itself

Villares' justification was voiced by the director general of its digital electronics division, Jose Maria Ribeiro: "We have not yet given Servus a position report because, since the end of last year, we have wanted to send one of our technicians to Hitachi in Japan to assimilate the technology of the application of adhesives, but only now in February has there been the possibility of sending him.

"We have not lost interest in that agreement in any way inasmuch as Servus is one of the most dynamic robotics companies in the country and has experience with hydraulics, something that we still do not know," added Ribeiro.

"On the other hand," he declared, "we have not failed to keep up with the rising trend, namely, the electrically driven robots, even for painting, conceived to be explosion proof."

The model manufactured by Villares is the RV6060, with six degrees of freedom and 6 kg capacity. According to Ribeiro, \$5 million has already been invested over a period of 4 years, including the contracting of specialized manpower and training abroad, the installation of the Robotic Application Center, in addition to integration with a complex processing network linked to a CAD/CAM system.

But Are Robots Being Sold?

Up to the present time, Villares has only sold and installed two robots, but another five are going to be delivered in March.

One of them, for arc welding, was purchased by VW after all the controversy over the importation of robots from Germany by that auto manufacturers, which today has about 15 German systems doing spot welding.

Since December, this robot has been doing arc welding on the seat track of the Fox, a VW car exported to the United States.

"The option for a robot is related to the demands of vehicle safety, with the need for a uniform weld, something difficult to achieve with manual systems owing to the repeatability of the operation," explained Ribeiro.

The other robot was installed in Brasprensas, a company of the Cobrasma Group, for welding the case of the differential of Ford's international truck, the Cargo. According to Ribeiro, in this case "quality was also a decisive factor."

Another quite strange application is that of Heller Plastics, which initially will use the robot with a cutter in the claw for cutting burrs from the injected panel of the Monza. In a few months, the cutter will be replaced by a system of cutting by laser developed jointly by Villares and Lasertech of Sao Jose dos Campos.

Villares buys from Villares. So much so that competitive bidding was held for the purchase of two robots by the electric motor division, for a line that is exported, and another for the arc welding of elevator components for export by the Atlas elevator division. These three should be installed this first half of the year.

A seventh robot is to go to the Regional Center for Informatics Technology (CERTI) in Santa Catarina, depending only on financing. "The robot that is going to CERTI has more than 2,000 hours of use in the Villares Application Center. We are awaiting the determination of financing, something we may do ourselves since we are interested in working together with that Santa Catarina group," declared Ribeiro.

He recalls that Cruzado II brought about uncertainty of investment for the business community and that since then Villares has suspended its decision on at least 15 projects. "Independently of the rate of sales, we shall keep to our schedules of nationalization and investments," he asserted, saying that the company is not earning anything now and that the sales already made plus the expectation of at least about 15 robots for 1987 will still not provide good profitability.

It remains clear that up to this time it has not been possible to earn enough even to amortize part of Villares' investments. "When the group decided to go into robotics, it was fully aware that it was an investment on which the return would come only in the long term, with profitability coming only after 3 or 4 years of sales. We were not unaware of the need for the industrial park to renovate itself and now more than ever we need to garner funds abroad by exporting," declared Ribeiro.

The parallel production of printed circuits was planned from the beginning in order to keep the Digital Electronics Division alive. Current production runs around 15,000 boards per month which, according to Ribeiro, guarantees maintaining the division in addition to providing a surplus margin for investment.

Sell Solutions

In addition to this, he made it a point to emphasize that a robot is only a part of the services that it renders inasmuch as the customer needs an integrated solution. This "system house" role is one that has also given Villares a financial return, one of the points of Ribeiro's strategy.

This makes clear the company's interest in the agreements with Servus and, more recently, with the Paulist Projects Company (EPP) of Diadema, Sao Paulo. But what is the "break"?

The 'Break'

Spot welding represents the largest slice of the market and its leader is DF Vasconcelos (DFV) which, it should be said in passing, is the absolute master of that segment. Villares leads in arc welding, while Ipsos, Servus, and BCM, among others, divide the intermediate range.

In 1984, EPP presented a plan for nationalization of the American Fanuc, a subsidiary of General Motors. However, its plan was not well received.

Last year, the company received a plan for automation of the assembly of the steering wheel and of the plate [?] [platô] in the crankshaft of the Monza that is exported. "I analyzed the costs and functionality and found that it was simpler to perform the operation with robots," related Vicente Manchado, president of EPP.

These robots, which are closer to manipulators, were built with the funds intended for GM's automation project. "The costs were equal because instead of a line, I synchronized everything into a single system," explained Manchado.

After this installation at GM, EPP presented its project for the manufacture of these systems to the SEI, which approved it in the form of Directive No 210 of 14 July 1986. Two models controlled by CP were approved: the EPP 2003 M60, with three large degrees of freedom, driven by a direct-current electric motor, and a 60 kg load capacity; and the EPP 2003 M50, with three degrees of freedom and a capacity of 50 kg.

In June of last year, four manipulators capable of mounting 120 crankshafts every 60 minutes were delivered to GM in São José dos Campos, São Paulo. In addition to that, the same assembly plant ordered another two manipulators for mounting the pistons and piston rods in the cylinders of the Monza motor.

Immediately upon learning of the EPP's accomplishments, Villares sought out the company to sign a cooperation agreement. Initially, this agreement provided for the use of Villares' robots in some projects executed by EPP, since this company also serves as an integrator or system house.

The courtship was shorter than was imagined and by the beginning of the second half of the year both should generate a robot. It is a six-axial system with an electronic control similar to the RV6060 which, according to Ribeiro of Villares, will be used for spot welding. This is where the "break" comes in, since the DFV monopoly may be broken.

The Coveted Spot Welding

Soltronic, which in 1984 presented a plan to the SEI for the nationalization of two technologies--Cloos, for arc welding, and Volkswagen, for spot welding, both from the Federal Republic of Germany--is again going to present a plan for the transfer of technology for the manufacture of robots.

"We were not approved then and in October of last year we received a communication from the SEI informing us that we could again present the nationalization plan for only one of the technologies. We opted for spot welding but we are still awaiting a better definition of the course of the economy in order to approach the secretariat," explained Roberto Hollnagel, director of Soltronic.

In the first presentation of the plan, the SEI justified its disqualification by judging it to be of greater interest for the company to integrate, and not

produce robots. Despite this, Hollnagel says that some of the principal manufacturers of robots at the international level were traditional suppliers of welding equipment, as Soltronic is here.

"Robots are used in 85 percent of the welding automations in the world and many of the manufacturers of welding equipment went into the production of robots, as is the case of ASEA (ESAB); Cloos, Comau, Kuka, Sciaky, Bisiach-Carru, for example. I do not see why Soltronic cannot produce robotic systems," argues Hollnagel.

In his opinion, 80 percent of the robots to be purchased in the next 10 years will be for spot welding, 10 percent for arc welding, and the remainder divided between manipulation, mounting, gluing, and other applications.

What he wants to show by this estimate which, moreover, is quite realistic, is that the biggest slice of the market is controlled by DFV, and it is for that slice that Soltronic plans to fight, "which is dependent mainly on the volume of automobile exports. I believe that only with a defined domestic economy will there be continuity of investments and the buyers abroad can have confidence in the Brazilian product," said Hollnagel, justifying his position of awaiting the course of the economy.

The Solitary DF

DF Vasconcelos, which has a technology transfer contract with the Swedish ASEA, has sold 25 robots thus far. "First we try to sell, which is extremely difficult since we are dealing with the sale of a solution and not merely a product. Now, within the next 2 months, we are going to open the new facilities of our robotics division, which will provide support in the engineering of integration, installation, testing, assembly, maintenance, and training," declared the director of that division, Lenio Ribas Zimmer.

But, after all, how did DF Vasconcelos get into the area of robots? According to Zimmer, the company's activity in the armaments branch requires in-depth knowledge of optics and precision mechanics, factors that are equally important in the production of robots. In addition to that, the DFV managed some projects and for some time was the supplier of carburetors, thus, possessing a certain familiarity with the automobile industries. "The majority of our customers are assembly plants. Most of these automations pertain to spot welding and the DFV has a robot developed especially for this application: the IRB90S/2. It is a robot with a maximum of six degrees of freedom, a nominal capacity of 80 kg, and is driven by servo-controlled direct-current motors.

The company also plans to nationalize the model IRB6/2, with a capacity of 6 kg, with more universal applications, such as handling, gluing, deburring, etc. As for the controllers, they will be nationalized by Prologo.

In Zimmer's opinion, there will be two phases in the installation of robots in Brazil: the first, replacement of operations in a concept of a traditional factory; and the second, within a new philosophy of integrated factory (CIM).

Against Monopoly

Aletron was one of the companies that did not secure approval of the SEI for the nationalization of robots--it was going to bring the technology of the Italian Fata. "I still do not know the reason for the disapproval. We would like to be producing robots inasmuch as the Fata technology is quite widespread; for example, GM is one of the biggest customers at the world level," bemoaned Giovanni Rumiano, the director of the company.

In his opinion, the monopoly in spot welding is creating barriers to the modernization of the manufacturing park, which makes it important for the SEI to exercise greater consideration in that regard.

"I do not say that the market is large for so many suppliers but what there should not be is monopolies of segments, preventing competition and consequently the qualitative and technical improvement of the robots," he explained.

There are rumors that GM is pressuring the SEI to free the import of robots, alleging that thus far the DFV does not have systems available.

"If I had spot welding robots today for ready delivery, I would sell them immediately," commented Ribeiro of Villares.

The position occupied by the DFV worries many people but it is not yet possible to assess to what point that is going to change the picture.

Uniting Efforts

Something common in this sector is the union of two companies: one with experience in electronics and another in mechanics.

For example, three models of robots are the result of an agreement between the BCM of Porto Alegre (Rio Grande do Sul)--which operates in the area of the automation and control of process--and Engemaq of Caxias do Sul--from the area of machines for machining by electroerosion, tampography [?] [tampografia] equipment, and for the petroleum area.

One of the models developed by the company is the EB 1085A, with five degrees of freedom, controlled by a microcomputer based on a CP. This system was developed with a pneumatic drive and a load capacity of up to 10 kg. Its use is in metalworking industries, which use stamping and forging, basically for the handling of parts.

Another simpler model is the LK which, according to the director of BCM, Jose Luiz Bozzeto, has been received more favorably in the market due to its greater speed and precision compared to the EB 1085A.

Of the equipment from both companies, the product that has received the greatest attention is the B6E robot, with six degrees of freedom and controlled by six (Z80) microprocessors managed by a CPU. This robot uses hydraulic motors and was planned for the painting area. The load capacity at the point

of the claw is 13 kg and there is a control of the paint flow to guarantee uniformity of painting. According to Bozzeto, the first units will be delivered to an assembly plant for body painting by June.

Like BCM, Atos is producing a control for robots. It is a programmable controller with some peculiarities, mainly of software. It has contracts with two companies. One of them is Guttler, which develops special painting arms with a controller from Atos to improve the quality of auto painting.

According to Norton Moraes da Rosa of Guttler's technical department, this is a very good segment since exports demand the competitiveness and quality of the products. More than a hundred arms have been marketed thus far and there are good prospects for this year.

The other company associated with Atos is Cibermaq, created in December 1985 to develop the mechanical part of manipulators and robots.

One of the company's products is a manipulator to feed presses, which is already being tested in a company in Sao Leopoldo (Rio Grande do Sul). In addition to that, a six-axial parts manipulator with microcomputer programming is to be launched. "The objective of this new project is to supply a simple and accessible system, that does not require highly trained personnel to use it," explained Breno Gustavo Nogueira Wurdig, director of Cibermaq.

Rio Grande do Sul Formula

In 1985, Micheletto Group and Metrixier founded Mixertech, which will do the integration engineering and the sales of systems, with the first making the mechanical part, and the second, the controller.

The robot produced, the DINO MA-320, has three axes in a Cartesian configuration and is expandable, since there is the possibility of including a fourth axis, permitting the system to rotate around itself.

For more precise work, spherical spindles and servo-motors are used in the three axes, achieving a repeatability of 0.2 mm and a speed of 40 m/min. As for the controller, one of the company directors, Julio Cesar Camerini, explained that there is a CPU dedicated to each axis, and a central one, and the possibility of being programmed remotely because there is a local network that permits communication with other equipment.

Thus far, the company has not made any sale which, according to its director, is due to the fact that it is a recent technology, and also to the uncertainty of the economy.

One marriage that did not work out was that of MCS with Taunus, which created Ipsø, a third company. "Last November, we decided to leave the project with Taunus because of incompatibility of ideas," explained Conrado Montineri Junior, director of MCS Engineering, a manufacturer of numeric controls.

The participation of MCS was supposed to be for the development of the robot's controller, while Taunus would produce the mechanical part. The integrator and the one charged with sales continues to be Ipso.

The nationalization project includes four models of robots with Reis technology (Germany) for the same controller.

According to Erasmo Maluta, director of the company, six units were built last year with delivery scheduled for this first quarter. "The delay is justified by the lack of peripherals in the market as, for example, welding machines," explained Maluta.

He asserted that one of the models has already achieved a 60 percent nationalization level, with the lowest level being 18 percent. "Perhaps we may make changes in the mechanical architecture and also introduce manipulators in our line," added the director of Ipso.

Two of the models are for 15 kg and a repeatability of 0.1 mm, merely changing the horizontal and vertical configuration. The other two are for larger loads (40 and 50 kg).

As for the segments served, Maluta did not reveal many details, reporting only that they pertain to applications of welding and the handling of parts. For this year, he foresees the construction of 12 units in addition to intensifying the nationalization of the controller.

With regard to the departure of the MCS from the project, Maluta opined that the orders for numeric controls must have discouraged the work of development of the controller by that company.

"We are sorry that we did not carry the development forward since we would have access to a new technology, however, market conditions do not encourage us," explained Montineri of the MCS. Independently of that, this company plans to present a project for the manufacturer of a controller for robots but it is going to wait for the market to mature.

Another manufacturer of numeric controls (NC) that had its controller project approved is CTL Informatics. "We use the same hardware of the NC, only modifying the software and small details," commented Engineer Ricardo Westphal Gonzalez, the company's commercial manager.

CTL has already been consulted by customers regarding this controller, which has the capacity to control up to eight axes simultaneously, but thus far it has not concluded any deals.

Maxitec, the manufacturer of numeric controls, may also serve the controller market, since it was going to supply the electronic part to Mentat. Only the behavior of the market will be able to answer that.

Manipulators

In the opinion of the president of Sobracon, Thomas Lanz, the robotics market is still "crawling" and simpler manipulation systems will be received more favorably in the next few years.

A clear example of this is the change of course of EB Projects of Sao Paulo, which developed the Orbital 600 robot together with the Technological Research Institute (IPT) of Sao Paulo and the Foundation for the Technological Development of Engineering (FDTE).

"We acquired good experience with Orbital 600 but from consultation we identified the fact that the market needs manipulators," explained Luis Ortega, the director of EB. The company recently delivered a "pick-and-place" manipulator to Texas Instruments for feeding an epoxy injector for finishing integrated circuits.

According to Ortega, another four manipulators will be installed at Texas Instruments and the forecast for this year is for the placement of at least 10 of these systems on the market. "Villares itself has already sought us out," he commented.

The Orbital 600 is comprised of a rotating base, a linear table, a first jointed arm which contains the base for attachment of the driving motors, and a second jointed arm and claw. The combination is driven by six pitch motors, which limits their load capacity; but according to Ortega, the future 700 and 800 versions will be driven by servo-motors or even servo-hydraulic motors. The present motor permits a displacement at an average speed of 2 radians per second, with definitions of positioning of approximately 0.08 degrees.

Control of the motors is executed by the control system in a closed network, with refeeding being done by coupled optic codifiers. Each degree of freedom has a permissible range of movement, with the ends being detected by limiting switches. The power necessary for feeding the motors and activating the various control devices comes from a power source associated with the sub-systems.

Because it works in a closed network, the Orbital 600 robot has a learning system with memory and is easy to operate. "The operator executes the job by simulation, at the controls, and stores the trajectory of the memory," explained Ortega.

The Opposite Route

Another company that plans to explore the manipulator market is Paulist Metals Machining (UPM). It recently delivered a system to Ford for transporting crankshafts from one lathe to another (published in MM 252, November 1986).

There are two arms for each lathe (one to load and the other to unload the machine) that move linearly on carriers [portais]. Each one of them has a claw operated pneumatically. These arms deposit the parts on a belt, which moves them from one lathe to another. This carrier belt has about 50 small

devices with followers (pallets), which support each crankshaft. Its length is 9.5 meters, along which proximity sensors control the "flow" of the devices.

This system facilitated the machining of 46 parts per hour. "It should not be disregarded that each crankshaft weighs about 13 kg, that is, a worker would be moving 4,784 kg per day, jeopardizing his health and at the same time reducing the uniformity of quality," commented Alberto Zucchetti, commercial technical manager of the UPM. In his opinion, quality is a determining factor for the use of automatic systems.

It should be pointed out that along with its work, the UPM is developing a project for a seven-axial robot with a load capacity of up to 35 kg at the point of the claw. "I plan to create various versions for the claw and, if possible, a multitask one because this would expand the field of applications and the flexibility of the system," explained the company manager.

As for these applications, Zucchetti has not yet delimited them but it is already in an advanced stage in the version for continuous-string welding and assembly. Direct-current servo-motors will be used to drive it. The controller of another robot manufacturer may be used.

In the area of injection, since 1980 the Petersen Company has been producing special manipulators for the placement of inserts and the removal of plastic parts in machines, which are quite simple systems.

In 1983, however, another application arose: the extraction of injected bumpers. "The new concept in bumpers required an adaptation, since for extraction of the molds, the operator had to leave a large hollow in the opening of the mold, practically having to go inside the machine, exposing himself to all kinds of risks, and many times not achieving success in the operation.

According to Hugo Donat, the director of Petersen, the manipulators permitted extraction, guaranteed the maintenance of quality, that is, a uniformity of quality through a thermal balance between the machine, mold, and the raw material; and led to a gain of productivity, avoiding idle time.

"This maintenance of quality is easy to notice because, since there is difficulty in extraction, some parts remain in contact with the mold longer than others, there is a variation in the extraction time with consequent distortion in the parts, inasmuch as the extraction temperature also undergoes variations," explained Donat.

In view of this requirement, Petersen began to study a full-range of a family of plastic parts that could be optimized with the application of manipulators. "We sought a universal manipulator that would serve the greatest number of parts and applications possible, making a study of the families of parts at many of our customers, which permitted a sort of standardization," he explained.

The contact with the SEI occurred as a result and, without problems the project was approved in June 1985. Three models are being produced at the present

time: a manipulator of injection channels that extracts the channel from the mold and the part falls automatically; a manipulator of light parts in two versions for parts of up to 1 kg; and a manipulator of heavy parts, in seven versions, only varying in dimensions.

"It is a market that is still in the gestation process. The customer needs to become aware of the advantages of its use and understand that the return on the investment may be rapid. It is a high investment at first glance but an analysis of the increase of production, of efficiency, and of quality may encourage the customer," said the director of Petersen.

One of the companies approved, which basically should produce manipulators, is the Zivi Cutlery. Despite the fact that little information is known about the progress of the project, it is known that its use will be almost exclusively internal, in feeding presses and the manipulation of parts from one station to another.

According to Umberto Bobatto of the SEI, Zivi's manufacturing project has been approved, that is, it has a prototype ready. This is also the case with Servus, BCM, EB, and Mixertech. Having projects under development, that is, where not even the prototype has been built are: WEG, Sulmecanica, and Engesa.

Engesa also does not provide many details of its project but, according to one of its officials, Miguel Witacker, development is proceeding. From the information given, Engesa's aim is essentially automation of the assembly lines of military vehicles. "I believe the development encompasses welding in tanks and armored cars, where the robots are very important because they have blexibility," speculated Hollnagel of Soltronic.

Sulmecanica is another company approved by the SEI and, according to Aldo Pansiera, its technical director, it has not yet gone into the manufacturing phase because it believes that the market for robots is not very big. "We presented a viable project based on experience in the manufacture of machines but we knew that the market would undergo a maturing period and that is what we are waiting for," he commented.

The company showed its intention to get into robotics, producing small manipulators and feeders attached to their machine tools, specifically, grinders. Pansiera believes that it is difficult to foresee the behavior of this market, but one may believe that it will evolve. "Most of the companies are looking for profitability and many of them may change their production plans if manpower costs become more significant in the overall cost figure. Many may automate in terms of that, but the most probable hypothesis will be that of automation in the companies that need to maintain their commitments, that is, export contracts and others, stemming from indebtedness for the expansion of production encouraged by the Cruzado Plan."

WEG said that it is not worried about the present but about the future, so much so that it will invest about 50 million cruzados in the new company created last September, called WEG Automation Corporation.

This company plans to develop servo-drives, servo-motors, and converters for direct and alternating current motors; simple and multiaxial positioning systems; textile and leather machine automatons; feeders for machine tools; and free-moving robots for the manipulation and transport of parts and materials.

Within that line, the first product will be a simple free-moving robot on a wheeled base and without jointed "elbows." "For the time being, we are beginning with automation of the companies of the WEG Group itself and, with the improvement of those manipulators, we may market them, but during this time we want to operate as integrators, developing software for certain areas of application," explained the director superintendent of this new division, Moacir Rogerio Fens.

Another important detail is that the new unit is located in Florianopolis (Santa Catarina), as a means of facilitating contacts with the Federal University of Santa Catarina and the Regional Center for Informatics Technology (CERTI). According to Fens, these contacts will be intensive with a view to the training of manpower and, for that purpose, teams will be sent to Germany and Italy to learn first-hand what is being done abroad. "We are starting but I believe that our participation will be appreciable within 2 years," Fens estimated.

What the Others Are Doing

The 16th company approved by the SEI's June 1985 directive was Regeltechnik, the old All Systems, which has a project for the development of a two-jointed arm. According to Dieter Thrum, the director of the company with headquarters in Rio de Janeiro, the project was "frozen" until a demand arises that will justify production.

At the present time, the principal activity of the company is the production of gas detectors. "This does not mean that we have given up but are only waiting for the right time to enter the battle for a market that is still small," Thrum explained.

On the other hand, Ciaci, a traditional company in the branch of chemical products and materials for the foundry sector, whose project for manipulators was not approved, is raring to produce them.

"We presented a project for nationalization of manipulators for feeding material, extracting parts, and the application of demolders [desmoldantes] in casting under pressure and for plastic. We were not approved perhaps because it pertained to nationalization of the products of the American Rimrock Company which, until a short time ago, produced this equipment with electro-mechanical controls, introducing programmable systems only a short time ago," explained the director of Ciaci, Peter Felsberg.

He believes that more important than producing the hardware is, basically, the development of software and that is where knowledge of the manufacturing process is vital. "Brazil does not need sophisticated systems but only equipment that takes into account quality, productivity, and the safety of the operator," commented Felsberg.

In his opinion, it is not possible today to foresee the robot market but it is a process that can be unleashed by multiple factors, from an export program to an increase in the cost of manpower.

Also among the companies disqualified are Panambra, which was going to nationalize the robots of the Cincinnati Company, and Ultrasolda, which was going to transfer technology from GDA of Germany.

"At the proper time, we plan to present the Cincinnati robots project to the SEI once again," declared Mario Mauricio of Panambra. But there are already rumors that the company is producing robots. "The truth of the matter is that we are nationalizing tridimensional tables, internationally known as measuring robots," explained Mauricio.

As for Ultrasolda, after the disapproval there are no plans other than that of supplying peripherals for the robots of other manufacturers.

Within the next few months, Digibras will have its first manipulator with practical application, that is, for the manipulation of parts for forging, with four degrees of freedom and a hydraulic drive (ROB22). "Immediately afterwards, we plan to launch another manipulator for lost-wax casts and a robot for welding, with four degrees of freedom," asserted Pietro Alessandro H. Ponzio, the technical director of the company.

Mentat Is Out, Discouraged by the Market

One of the best known companies created for the production of robots suspended its activities at the end of January. Namely, Mentat, derived from the partnership between Maxitec and Varga, created to nationalize model R3 of Mantec, a subsidiary of the German Siemens, within 4 years.

The first stage of the company was the formation of a team and announcement of the product. The sum of \$500,000 was invested in this work in addition to the acquisition of units for research.

"In the course of this first phase, we ascertained that the market was small. In addition to that, at the moment, there are very few types of applications that a 15-kg robot can execute. International statistics show that the first applications for robots are spot and arc welding," explained Thomas Lanz.

Even with the market needs [not] being so great, the unit cost around \$100,000, and the installation investment equally high, negotiations for three robots were at an advanced stage.

"If we had made those sales, we would have had to create a factory and service structure that would have required investments of \$1.5 million. We decided that Mentat needed to hibernate. Thus, all of the technical corps of the company was incorporated into Maxitec and sales have been suspended," commented Lanz.

According to him, the market for the R3 was very small and with the lack of definition of the economy a difficult situation could have been created, even compromising the two partner companies. He said also that it was difficult to predict when Mentat might emerge from this status, depending only on the behavior of the market.

BRAZILIAN AUTOMATION SECTOR TO BE UP 73 PERCENT IN 1987

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 14 Apr 87 p 1

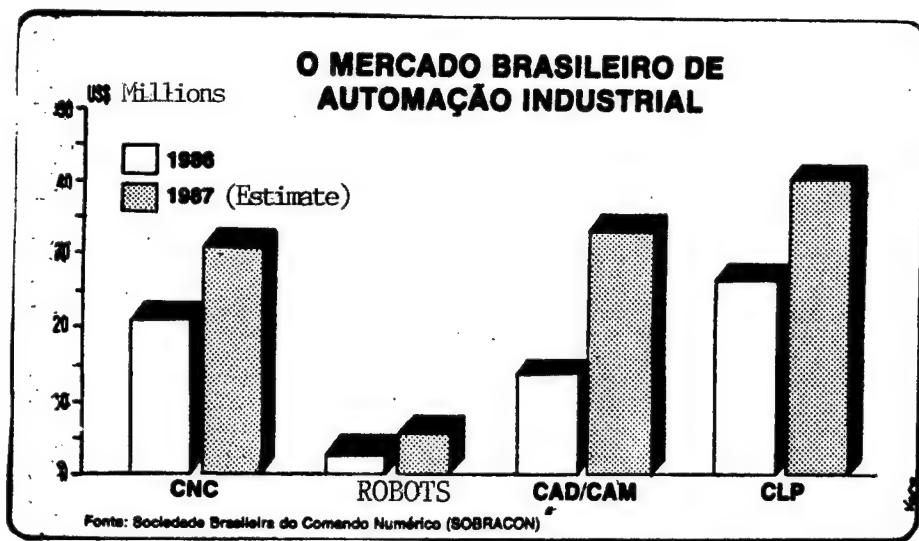
[Text] The 70 Brazilian informatics industries that manufacture parts and equipment for industrial automation--numeric controls (CNC); industrial robots; graphic computation systems (CAD/CAM); and programmable logic controllers (CLP)--sold almost \$66 million worth in 1986, 10 percent more than they forecast at the beginning of that year. The sector grew 45 percent compared to 1985 and the estimates for 1987 are for sales of \$114 million for a growth of 73 percent.

These results and forecasts were ascertained by the Brazilian Numeric Control Association (Sobracon), which conducted its first survey of the national industrial automation market. Thomaz Michael Lanz, the president of Sobracon, points out that the sector emerged in Brazil less than 5 years ago and already shows significant performance and employs almost 5,000 employees.

In the opinion of the executive, the slowdown of the Brazilian economy may be affecting other sectors but will not bother the market of the manufacturers of parts and equipment for industrial automation. Lanz asserted that the producers of machines have orders on hand until May of 1988, which in part will guarantee the growth of sales by the manufacturers of computerized parts and components. At the same time, the president of Sobracon also believes that the priority for exports will help maintain the market inasmuch as it is the exporting industries (especially in the auto parts, assembling, military and aviation sectors) that are "pulling" industrial automation in Brazil.

According to the Sobracon survey, the industrial automation segment that grew the most in 1986 was that of numeric controls, with sales of \$22.2 million, more than double the forecasts of the manufacturers. On the other hand, the robotics segment had sales of only \$2.9 million, 50 percent of the manufacturers' estimates. The graphic computation systems (\$12.7 million) and programmable logic controller sectors (\$27.8 million) were up to estimates. This year, Sobracon estimates that the graphic computation systems will again lead growth in the industrial automation sector, followed by robots.

THE BRAZILIAN INDUSTRIAL AUTOMATION MARKET



Source: Brazilian Numeric Control Association (Sobracon)

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CSO: 3699/66

ARCHER AIMS TO MAKE BRAZIL THIRD IN S & T

Rio de Janeiro DATA NEWS in Portuguese 4 May 87 p 6

[Text] The current computer policy supports a growth rate capable of taking the country, within 3 years, to third ranking in the computer market, preceding Great Britain, France, and Germany. At least this is what Minister Archer told the subcommission on science and technology.

If it depended only on the subcommission on science, technology, and communications, the national computer policy would have its defense ensured. This became clear at the public hearing of that subcommission held on 20 April with Minister Renato Archer and his team. One of the points which most impressed the congressmen was the guarantee given by Minister Archer that, within a maximum period of 3 years, Brazil will jump from seventh to third place on the world computer market, exceeding countries such as Great Britain, France, and Germany.

According to the minister, this will be possible owing to the high growth rates that the sector has been attaining, in the course of a well structured computer policy.

Of the 23 congressmen who are members of the subcommission, only 15 were present, the majority from PMDB [Brazilian Democratic Movement Party]. For this reason, Minister Archer and his team did not meet with any very strong opposition to the policy developed by the Ministry of Science and Technology. The congressmen's remarks proved to be, basically, praise for the market reserve, making Minister Archer the great star of the meeting. In view of so much receptiveness, even one of the leading opponents of the Computer Law on the subcommission, Deputy Fausto Rocha (PFL [Liberal Front Party]-Sao Paulo), did not find sufficient courage to put forth the harsh criticism that he has been making of the market reserve, and confined himself to challenging Archer in a very hesitant manner. This gave the minister another opportunity to tell the constituent members the benefits of that policy, saying that the Computer Law "was one of the most valuable that the Congress has passed."

Assessment

At that hearing, in addition to Minister Renato Archer, the leading agencies associated with the MCT [Ministry of Science and Technology] were represented,

including CNPq [National Council for Scientific and Technological Development], SEI [Special Secretariat of Computers], INPA [National Institute for Amazon Region Research], FINEP [Funding Authority for Studies and Projects], and INPE [National Institute of Space Research]. The heads of the agencies confined themselves to making an assessment of the activities carried out. And some, like the head of CNPq, Crodowaldo Pavan, and the head of INPE, Marco Antonio Raupp, went further, proposing that the Constituent Assembly foster a greater incentive to the national technological sector, which is now capable of facing the great challenges of development, but requires sufficient resources to compete, in a balanced manner, with foreign business firms.

Crodowaldo Pavan also suggested to the congressmen his conviction, coinciding with the opinion of Archer's team, that the new Constituent Assembly should establish the principle contained in the Computer Law, that the Brazilian market is an asset of the nation, "the control of which is critical to ensure our development, as well as that of our mineral resources." Because he believes that reserving the Brazilian market for mutual cooperation and work is a natural right and an act of sovereignty on the part of the nation.

Autonomy

Comdr Jose Ezil Veiga da Rocha, head of SEI, in his remarks to the congressmen, noted that, if he had to write the article on that topic in the new Constitution, he would stress that "the government may not assume external commitments that would compromise the process of training and autonomy in science and technology." To underscore the importance of that strategic sector, the SEI head said that, last year, the billing of the national computer companies amounted to \$1.53 billion, compared with the billing of \$1.474 billion of the foreign companies; and the number of jobs generated by the national firms was 40,000, while in the case of the foreign companies it was only 10,000. In addition, he disclosed that, in 1986, for every dollar exported, the sector produced \$2.5 in the country. But, despite the success encountered at that public hearing, Minister Archer's team is aware that the National Computer Police will not be so well protected in other subcommissions as in the one on economic order where there are major foes of the market reserve.

2909
CSO: 3699/68

GOVERNMENT INVOLVEMENT IN COMPUTER INDUSTRY

Investments Cited

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 p 7

[Text] The relations between the government and the computer industry in Brazil include countless situations that are not always very clear. Bribery in public bidding, unfair competition on the part of state agencies with private computer companies, and rather indefinite figures to assess the state's participation in the sector are some components of that multifaceted universe. The computerization of the government per se is complicated. The computer master plans [PDI] of the federal, state, and municipal companies, approved by SEI [Special Secretariat of Computers], are often relegated to secondary status. The top-ranking organ of national computer policy, the Ministry of Science and Technology, is even now organizing its CPD [Data Processing Center]. In their relations with the government, manufacturers and suppliers of services confront a "via crucis" of bureaucracy, but nevertheless, they deem it satisfactory to sell to it. It is a large-scale purchaser and pays well, although it is slow in its decisions and in the payment of invoices.

As in the case of many surveys and statistics in the computer area, the public sector's participation in the Brazilian market is not precisely demarcated either. In 1986, the Special Secretariat of Computers attempted to gather information (based mainly on the public organs' computer master plans) that would enable it to draw the computer profile in public administration.

Overrun by the Cruzado Plan, which changed the national economy, and hence the figures contained in the document, and by the time lag in the collection of information per se (the available data did not arrive until 1984), the material organized by SEI therefore contains estimates that afford a notion close to the "possible real one." Since 1980, the computer field's share in the federal budgets has been increasing slightly, arriving at an index of 0.83 percent in 1984.

SEI's estimate is that, in 1986, that share reached 0.9 percent of the federal budget. Taking this estimate as factual, an approximation of the correct one is possible. The government's budgetary execution for 1986 has not yet received

the OK from Congress but, based on the fiscal budget proposal of between 400 and 500 billion cruzados, it is reckoned that, last year, the computer field consumed 5 billion cruzados from the government.

The government is a major user of mainframes. In the purchases of equipment of this type programmed in the PDI, there is no way of differing greatly from the SEI advice to the purchasing bodies. But few multinationals offer large-sized computers in the country, and each administrative organ selects the one that it deems most suitable. With regard to the systems' microcomputers, the choice is made in virtually the same way. In both instances, the selections are based on the bidding law for equipment purchases.

Raimundo Nonato da Costa, chief of the computer department in the SEI public administration, remarks: "During recent years, the government has started to be concerned about the social sectors, and the tendency is to improve computers in the service of the citizen." He claims that many state government investments have often been observed to improve or serve the citizen.

The PDI, as the computer master plans are usually called, are programs for investments, resources, and provisions that the federal government organs submit annually to the Special Secretariat of Computers. In theory, the ministries and organs of public administration are geared to the computer policy, and program their activities for a 3-year period, monitored every year. In fact, however, the monitoring of the activities is no easy task. For example, a Central Bank official recalls that the organ (a major computer user in the government) has been attempting since last year to devise its PDI. But time has elapsed, and other issues have been leaving the plan for later.

The available data make it possible to draw an approximate profile of the sector.

Government's Equipment, System

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 p 8

[Text] The computerization of the Ministry of Science and Technology [MCT] has been slow, and its organs are not yet integrated. Better results have been accrued by the Central Bank, which controls the national economy.

The evidence that computers are an area still far removed from the bulk of the population, captivating only those who succeed in entering this leading technology, is perhaps provided by the public sector precisely. With salaries that are generally far lower than those of the market, the professionals in this sector realize that they are using a fundamental tool in the service of the government; and, furthermore, that the mastery of the technology represents hope for a better country. This may perhaps be one of the reason that the public service professionals dealing with computers have ended up resembling a foreign body in the organizations.

Often (almost always), the work pace of this personnel has not contributed to the confirmation of the myth that a public servant arrives at a certain time, doesn't do much, and leaves early. There are the ones who disturb the security of the premises, the cleaning personnel, and all these employees who take care of the buildings after a certain time. They always leave later.

They are often considered the elite of government service among their other colleagues who still consider the computer to be a bugaboo. For example, the story is told in Brasilia that, on one occasion, the CPD head of one of the ministries issued a regulation forcing all the administrative agents to sit in front of a CPD computer for an hour every month, so that by doing "something" with the machine they might dispel the mystery of the "alien being" which could even steal their jobs.

Today, the computer policy per se and the pressures being brought to bear on it have led the issue to discussion. Many people are now citing the need for a national industry, for mastery of the technology, and the importance of all this. Nevertheless, the use of equipment and systems is not yet a matter so near political discourse. A major example of this observation is the Special Secretariat of Computers itself. Totally uncomputerized (although it is attempting to change this situation), SEI, which deals only with computers, certainly has employees (to be sure, on lower levels and less technical) who have never touched a computer.

The Ministry of Science and Technology, a major organ in the directing of the policy, was created and was concerned with its computerization. In a slow process, but one which has been showing good results, according to the CPD chief, Augusto Wagner Padilha Martins, the MCT is attempting to become computerized. With only 12 employees to deal with the administration of data, programming, development, and operation, the CPD has already developed a system for circulating the ministry's payroll, for example. It may seem like something simple, but not in the federal administration, where the vast majority of agencies contract with SERPRO [Federal Data Processing Service] for this service.

The organs comprising the ministry, since they had different origins, have never experienced the concern for being harmonized. The National Institute of Space Research (INPE) has Burroughs equipment; the National Council for Scientific and Technological Development (CNPQ) has IBM; and so on. With this CPD that is starting to be set up, Augusto Martins wants greater interaction between these agencies and MCT.

Last year, the equipment selected to open the center was a Cobra 480. It has good speed and a good storage capacity. However, a greater demand was diagnosed, and negotiations are under way with Cobra to exchange it for a 580 (the company's new offering), a mini with more speedy processors and a capacity for 64 terminals.

All the work that the CPD is doing and attempting to do will be revealed to SEI with the submission of MCT's First Computer Master Plan. The CPD chief claims: "We shall meet the deadline, because it was 28 February." He concludes by saying: "The people have to set the example."

But this "example" is not always a mere attitude. MCT has a small CPD, still in its beginning phase. There are currently 12 terminals distributed among the offices, and work is being done. But, on the opposite side of this reality there is the Central Bank, the country's leading financial institution, with quite different services.

Exchange

With the Brazilian economy as it stands, the work done by the Central Bank is becoming an increasingly greater assurance for any type of measure to be adopted. One example of this is the debated exchange centralization. If the political option were taken, the economy would not have problems; because SISBACEN [Central Bank Information System] has, in 2 years, accomplished what no other government agency has achieved (except for the enterprises rendering data processing services, such as SERPRO, DATAMEC, and DATAPREV).

With a moderate installed equipment (recently expanded with the purchase of a 3090, the IBM 200), the Central Bank now has all its systems on-line. There are four large CPU [Central Processing Units], in addition to the 3090, a Fujitsu computer, a 3081 Kx3, a 4381 R03 (all with two processors), two Cobra 540, two 530, and two 520; 420 microcomputers (20 Cobra, 230 Itautec with 8 bits and 180 Itautec with 16 bits), 1,100 terminals, and 800 teleprinters. The BC's external network reaches 60 cities, in financial institutions with access to all the on-line information.

If, at present, a financial institution in Uruguaiana could learn, within a few seconds, at the BC, the export exchange rate, or if a farmer in the Northeast procures a settlement from PROAGRO [Agriculture and Livestock Activity Support Program], through access to a bank in his town, it is because a great deal of work has been done. The Central Bank's CPD has only 110 technicians and 50 percent of that personnel and of the installed equipment has been devoted to the external area (control of payments, foreign debt, foreign capital, etc.). The other 50 percent provides for the administrative activities.

The Central Bank's computerization has become necessary and is urgently required. As the major financial institution, the bank receives data from the International Monetary Fund, foreign banks, etc.

It is necessary to keep up with the times and, moreover, to control the financial operations in the country. Every year, for example, 4 million new rural operations are carried out. More than employees to check those data on paper, there has been a need for a computerized system such as the one available at present.

In December 1982, the bank began undergoing pressure for modernization, streamlining of costs, and improvement in its work. At that time, the Central Bank began preparing to disseminate the computer culture, as the head of the bank's CPD, Hugo Dantas, recalls. SISBACEN was established in 1984, and since 1985 nearly 90 percent of the exchange operations have been recorded.

To set up this entire system, the Central Bank had to purchase equipment. Hugo Dantas remarks, "to buy so many Cobra micros, and to balance the policy." For several years, the BC submitted detailed computer master plans to SEI, taking care to abide by the policy. Last year, the bank bought 5.5 million cruzados' worth of cryptography equipment from Prologo. The investments made by the BC

in the computer field have made some control over the external area possible. Computers have 1.2 percent of the agency's budget.

But there are times when the bank has been in an unpleasant position for procuring equipment. And, this time, it knows better what will work, and needs to accrue results from the purchase. The BC does not have SEI's standing. If it decides to purchase or lease equipment, it goes to the secretary's office and to CACEX [Foreign Trade Department] to procure the import. This was the case with the recent leasing of the 3090 with a 5-year contract.

Within the organization, the BC's volume of services has caused the CPD employees to be "still another alien body." The majority of them bankers, who enter the computer field (45 analysts competed for the position, while the other 55 came from the bank's regular administration), they always leave long after the normal office hours schedule (1800 hours), and do not rest on Saturdays, Sundays, and holidays, which is normal in public administration.

Manufacturers', Suppliers' View

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 pp 10-11

[Text] Talking about the government as a client is not the favorite topic of native or foreign manufacturers and suppliers of services. The purchasing power and influence that the "client" could achieve on the market inhibit the suppliers. But some think that the government is not using that power to enforce the law or make the market rules more stringent.

To participate in public bidding or competition, the main document required is the Certificate of Legal Observance, which gives the purchaser assurance regarding the suitability of the supplier. There is other red tape that must be followed, but it often is not. The theory requires an honest bidding for honest purchases, but some suppliers remember that there is a certain game called "sweeten the notice": the game of marked cards, in which the notice is prepared in such a way that only company X can be the winner.

One interesting fact is that certain hardware purchasing notices already contain specifications of the equipment makes. The one claiming this is Roberto Rudge, director of the Sacco Computer Store, noting that the maximum variation in price of the same manufacturer among resales, in bidding, is 5 percent.

The suppliers complain of the lack of a standard contract that would guarantee good faith in the bidding. Therefore, the requirements are changed from one bidding to another in a same state entity. This lack of a standard makes things more difficult for the supplier. Influence peddling is quite common and, although no one would cite or indicate names, it has become a widespread complaint. "Creating difficulties so as later to sell facilities" is also common in the purchases made by the government. According to Flavio Sehn, president of Edisa, the government is "fraudulent when it decides to purchase

equipment or systems, because it always makes great demands regarding guarantees, but does not always give anything in return."

But it is not all summarized in a list of complaints. The government pays well, and usually purchases large quantities. And when the end of the year arrives, it buys fast in order to spend the budget; because unused funds are taken back by the Treasury. For suppliers, the year's end is a ball.

Bureaucracy

According to Rafael Barbosa da Silva, vice president of Sci, a software, consulting, and training company, the private sector is more dynamic, and makes decisions more quickly. In the heavier state sector, the decisions are more delayed, because the bureaucracy is greater. But he has no complaints about the government as a client, since it currently accounts for 50 percent of his company's services.

The bureaucracy is the main obstacle for the government's suppliers. Rafael Barbosa da Silva recalls that he was forced to send an employee on a trip of 2,000 kilometers, and pay the air fare and the hotel expenses; because a certain state agency was not making payments through the banks. It was only delivering the check to an authorized bearer, even though he had to come from the other end of Brazil. But the Sci vice president maintains that the government as a client has great purchasing power, and usually pays without problems; although he has made a legal collection from a public enterprise that did not keep its commitments.

The government delays in deciding on a purchase, and that has prompted many companies to cease negotiations with it, according to Silmar El-Beck, director of Compucenter. After having completed the cycle of deciding on the purchase of a certain product, the government still spends relatively more time than the private company on settling the negotiation.

El-Beck comments: "So as not to suffer harm in business with the government, the supplier must, from the time of the proposal, have total control over its costs"; giving a reminder that the gap between the decision to purchase and the payment for the product is also more drawn out and complicated than with private firms. Generally speaking, the state agencies do not accept bank collection and a 30-day period beyond the month to settle the debt; they do accept 60 days beyond the month and collection on hand.

The multinationals have no complaints about the government in their list of clients. George Herz, director of foreign relations for Unisys (formerly Burroughs), claims never to have had a problem with the government insofar as sales are concerned. Supplier of over 70 large-sized systems for the Union, and having the largest Burroughs facility in Brazil at Dataprev, Herz says that the difference between the private client and the government as a client is that the former is more flexible, without too much bureaucracy. The bureaucracy also varies from one state agency to another. Some have already received the spirit of Helio Beltrao, the father of debureaucratization; but others still resist reducing the volume of paper in their offices.

The basic difference between national and multinational company sales is that the Brazilian Government requires that the equipment be made completely in Brazil; except, of course, in the case of equipment not produced here. Unisys, with a factory in Veleiros (Sao Paulo) makes series A computers, magnetic disks, disk controllers, and printers in the country, in addition to working with national companies based on an OEM [original equipment manufacturer] system.

In addition to the Brazilian legislation, the foreign firms also abide by the laws of their countries of origin in sales to state agencies. George Herz recalls that, in 1974, a time when Brazil was under a dictatorial regime, the then Burroughs firm sold the first computerized system for public security, to be installed in Sao Paulo. But, to have the transaction authorized by President Jimmy Carter, the company had to prove that the system would not be used for political repression; because the United States was especially concerned over human rights violations in Brazil.

Even if the equipment is manufactured in the country in which the sale is being made, there must be authorization from the home office. This detail is extremely important to the U.S., because the American companies always sign a contract stipulating that the manufacturer will not be held liable for accidents to third parties. For example, no user of the Metro can sue the company supplying the traffic system in the event of an accident. The one liable will always be the Metro, even if the failure is in the equipment. George Herz claims that this concern is not yet part of the Brazilian culture, but in the U.S. any citizen can sue any business firm for personal damages.

Bribery Called 'Essential Ingredient'

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 p 11

[Text] He arrived for the meeting on time and, between a whiskey and a draft beer, was left with the two persons. He began by excusing himself: "Everyone knows how to play. I don't know more than the others, and I won't discuss anything new." He was calm and ashamed. While he explained that, "after resisting for 2 years," he had joined the public gratuity club, he looked for a cigarette and nearly regretted having considered the topic of conversation "fitting." He explained: "I start from the principle that everyone has a price. I always offer extra benefits, and half of the time the sale is made. In the others, it is likely that my offer has been underestimated."

At the age of 29, he could be considered a very successful sales professional. But he has no answer when they ask him about the part played by bribery in the adjectival definition. He makes the comparison: "No one asks why there is only one bullet in the Russian roulette revolver's barrel or even why this or that person had bad luck. The rules are set, and whoever wants to join in must be subject to them." The rule, in this case, is simple and objective: "If I don't, someone else will." It seems like READER'S DIGEST philosophy. It is not. Sao Paulo businessmen, backed by high-level public employees, estimate that, out of every 100 cruzados worth of computer equipment sold

to the government, 2.50 cruzados is immediately pocketed by assiduous state employees or by intermediary "rats" with "free passage" in a certain agency. Others cite higher figures, but it seems true that at least half of the business deals closed with entrepreneurs from public administrations are, either directly or indirectly, greased by gratuities ranging between 3 and 10 percent of the value of the contract. One of the most renowned business men from the computer sector could not recall the last time that he made a "totally legitimate" contact with entities supported under the shadow of the state.

He listens engrossed, drinking another whiskey, and agrees. He claims that the "rats" (often "consultants" for state agencies or ministries) show up out of nowhere when the company expresses an interest in a bidding competition, for example, so as later to vanish with their appreciated dollars. But they could be goods, travel, or ordinary cruzados. The risk also pays a part; but it is minimized when one notes that the "rats" don't want the cheese burdening the profit margin of their incidental benefactors, and agree to have the popular Incentive to the Modern Purchaser (the sub-government's ICM [Merchandise Distribution Tax]) added to the prices.

Silence

Anyone who dares to discuss the matter with that cautious connoisseur also learns that the institution of the gratuity is sealed by a conspiracy of silence in which anything or nothing goes, including blackmail. A rule increasingly familiar to computer company executives (half of the sector's sales are directed toward the government), the harsh law of bribery does not accept about-faces. "It is a white collar organization," recalls one executive from the software sector, claiming to have seldom used the expedient.

But the course of action that is followed by what is also known as CB (or "shutting up") really appears to be the work of professionals, wherein there is no room for heroes or bandits. This is what certain state employees think: It is a repayment for courtesies which, after all, does not interfere with the good results of the service or product purchase transaction. The director of one service company claims: "The best course of action is to 'buy' the public bidding." If the "rat" does not show up, the game of removing the body from the casket will be without a ladder, but no less careful. This holds true of a Sao Paulo computer manufacturer who was uncomfortable collaborating with the domestic finances of a public employee. After closing the "deal," he attempted a swindle. As luck would have it, he failed. He received notice that there are some ways of giving business firms the status of a "public breach of contract," a situation that puts them out of business with the state for a long period of time.

Whether a bluff or not, it is a strong card, and respected. It does not require display. The fact is that some business with government entities and enterprises is closed before the publication of the necessary notice. Then, the submission of the envelopes is a mere formality.

Quite self-assured and good-humored, the young businessman, after his third whiskey, also explains that "often" the one responsible for preparing the notice can direct it toward a specific product, by requiring typical features, technical specifications, bonds for participation, linking the purchase with a supply of supplementary products, and so on.

However, the selection of the company to be "bitten" is judicious; the employee must be covered. This does not mean that the analyses of the problem by the agency's technical area will be followed regularly. On the contrary, the decisions are in other realms.

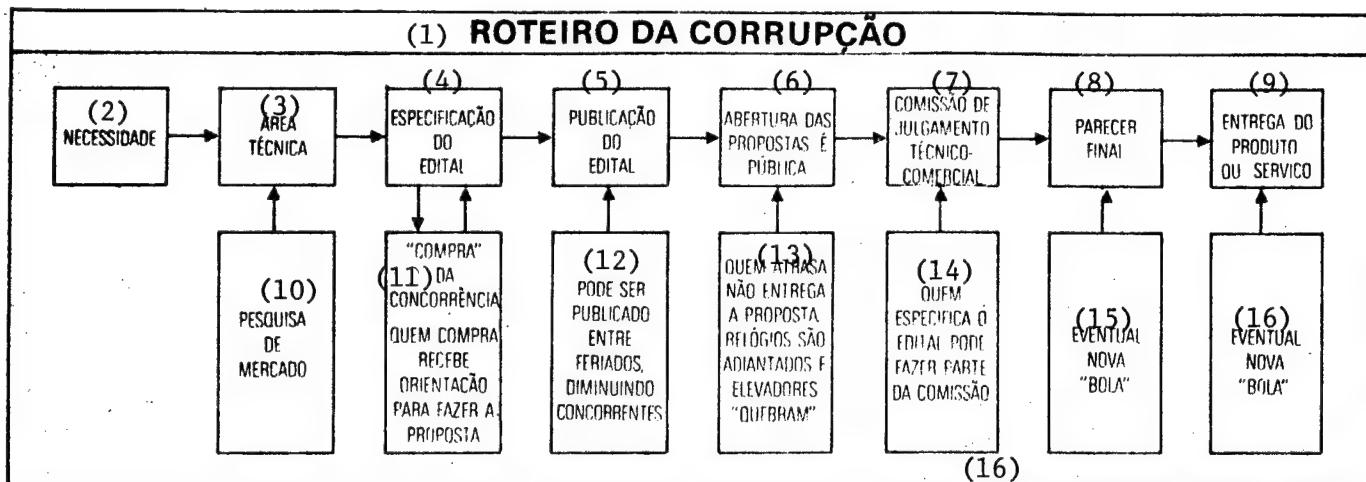
Obviously, the publication of the bidding competition in newspapers, possibly done on days missed between holidays, could bring surprises to the bidders. That is predictable and avoidable. It is a rule, on the day of the opening of proposals (done in a group by all the candidates), that the board deliberates regarding those which are delayed only a minute. Ordinarily, late-comers do not enter. The mythology relates how there have been "genuine" instances of clocks moved ahead in departments, or elevators which "break down," holding up carriers of proposals not indicated for winning. But all this may be redundant. Quite often, the employee who itemized the notice is a member of the commission to judge the bidding. All in the family.

One small supplier of computer services to the government remarks: "It is ironic to note that the requirements stipulated in the notice (such as that for capital stock exceeding certain limits, or the company's strong financial position) alone could reduce the risk of gratuities." And, in fact, "ostensibly moderate mechanisms can become sufficiently subtle weapons for keeping the informal bribery machinery anonymous and fully operative."

Many people in the industry persistently think that things are not so bad when dealing with the state. But the opposite opinion is more widespread, and has constantly received new supporters. Perhaps it may even reflect another outbreak of requests for political "purses" during last year's electoral period. However, that is an isolated opinion. According to observers, the percentage of employees or entities in which the "casket" is a passport has remained stable during recent years; and this seems to be a clue for locating the roots of the problem which, moreover, should not be such a great problem as the one reckoned by the UN, which has recommended viewing it legally as a crime. At least this is what one infers from the silence which shrouds it, both on the part of the industry and the government.

There is a lack of sound added to the inequalities as well. There is no profile with clearcut features of that gentleman who requests money for doing what he is already being paid for. Young government "yuppies," graying middle-class gentlemen, middle-aged women, or consultants of various stripes: the beggars form a mixture of human types. What combines them is the knowledge of the almost subliminal "touches" that they must apply to the gifts of cheese; and, in addition, the skill in carrying out the process of selecting the suitable equipment or services.

In the middle of the night, he might go home calmer than he arrived. He had been convinced that the conversation was not an attempt at bribery.



FONTE: EMPRESÁRIOS DO SETOR

Key to Chart:

1. Route of Corruption
2. Need
3. Technical area
4. Specifications for notice
5. Publication of notice
6. Opening of proposals is public
7. Technical-commercial judging commission
8. Final decision
9. Delivery of product or service
10. Market research
11. "Purchase" of the bidding, whoever buys receives instructions for making the proposal
12. Can be published between holidays, reducing competitive bidders
13. Anyone late does not submit the proposal, clocks are moved up, and elevators "break down"
14. Anyone who details the notice can be a member of the commission
15. Possible new "bribe"
16. Source: Businessmen from the sector

Computer Executives Comment

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 pp 12-13

[Text] The Athenian ruler, Pericles, in a memorable and erroneous speech delivered 2,400 years ago, predicted that all people would start receiving their wages from the state: they would be engaged in military, civilian, or manufacturing production activities. The reasons have changed, but the contemporary state, like its counterparts, continues to consider its utopia as Pericles did. The government is still an entity that is simultaneously bothersome and necessary, but often moved by gears that imagine themselves to be independent of the rest of society. With the same economic power as in Pericles' time, while the state's presence is almost nil in some sectors of the economy, in others it has spread, squeezing the business of private citizens.

It is all this that consultant Otavio Gennari Neto, former head of the Special Secretariat of Computers (SEI), describes as "the principle of the state's self-sufficiency." A long-time critic of governmental hypertrophy, particular insofar as electronic data processing is concerned (his first criticism dates back to the 1960's), Gennari thinks that "nearly all the agencies want self-sufficiency in computers."

According to Gennari, this is a problem with dimensions similar to those of the thwarted attempts to privatize state entities. And it should be accorded the importance that befits it: It has been estimated that half of the demand for data processing services is in the hands of public administrations, directly or indirectly, and the same percentage applies to the software sector. According to critics, with this power in its hands, the government nevertheless does not know how to manage it. And, what is worse, there are instances wherein, through its large internal processing bureaus, the state has decided to render services to third parties, stealing another portion from the private companies' plate. And consideration must also be given to doubts regarding the effectiveness with which it handles the information at its disposal, especially after the removal, in grand style, of the income tax census from SERPRO [Federal Data Processing Service], sold to a Sao Paulo company which is poorly managed.

Agreeing indirectly with this criticism, Gennari thinks that, in addition to maintaining the prevailing order, the government has just one course of action to follow, namely, that of decentralization. But that would be a political act, and it appears far from practicable. "It is a cultural problem," claims Egidio Bianchi, president of the Sao Paulo State Data Processing Company (PRODESP), one of the largest Brazilian public bureaus; making the comparison: "In the United States, chains managed by private entities are common, but in Brazil the idea has been poorly accepted." Bianchi considers it improper to compete on the market with private service firms, but notes that not everything that the state processes can be worked on by third parties. "There are instances of mayors of interior cities who have been blackmailed with the 'disappearance' of documents, for not having reached commercial agreements with bureaus." He stresses: "The public authorities cannot be left at the mercy of this."

The former president of the Rio Grande do Sul Data Processing Company (PROCERGS) and current president of EDISA, Flavio Sehn, also considers those restrictions necessary. But he has different reasons. Sehn claims that, at the beginning of the century, typing services were also most likely contracted from specialized firms, and now this would be completely inappropriate. He comments: "In the same way, data processing is a common internal service in any company."

To set the limit of the government's activity, Sehn strikes the same key as Gennari: The public agencies should not compete for space on the private market. However, there are obstacles to this being possible to ensure. According to one businessman, the statutes of most of the state data processing bureaus , to confine ourselves to just one example, allow the rendering of services to private companies. The businessman claims: "There are sectorial policies attempting to prevent this from happening and becoming a rule, but they are followed with different emphasis, and there is no law."

Even considering this group of exceptions, the president of the Sao Paulo local of the Association of Computer and Subsidiary Equipment Users (Sucesu), Wilson Lazzarini, views the public authorities as "a market associated with the public computer enterprises." To cast his vote, Lazzarini considers the fact that the government's technological policy is attempting to be increasingly centralizing, giving priority to small and medium-sized equipment produced by the Brazilian industry. He stresses: "It makes no sense to turn over work processed in national equipment to private bureaus which generally use obsolete and imported mainframes." Former technical director of PRODESP, he also notes that this type of operation is often uneconomical. He gives the example that, "In Sao Paulo alone, there are 550,000 public employees, loading 10 gbytes of memory."

Nevertheless, Lazzarini sees gaps that would enable both the private and state computer services markets to grow, and without becoming stifled. One of them is the privatization of the services of firms such as Datamec, which does batch processing, and the federal and sports lotteries. In cases such as this, the Sucesu president's only reservation involves the nationality of the firm that will receive the order: it must be Brazilian. For the public agencies, his prescription is almost classic. Noting that it is essentially the government's responsibility to provide for social projects, he advocates the proposition that, with computers, the public authorities should concentrate on their end-activity. Gennari agrees: "The consumer has virtually no immediate access to any government information concerning him. If the government puts concrete plans of this type into effect, it will find that there is still a repressed demand."

At the same time, Gennari refutes criticism regarding the excessive consumption of computer products, cited by certain business owners as a preponderant factor in government business. He comments ironically: "This story about the government wasting is from the 1960's." In his opinion, a typical example is automatic banking, which is far less developed in the Federal and State Savings Banks when compared to the stage reached in private commercial banks.

That concentration of internal government controls (not aimed at consumption) is what usually clashes with the intermediate-activities, causing problems. The alternative, still according to Gennari, is to delegate part of the services role to contracted firms, concurrently turning over the state computer bureaus for public access. He reasons: "When the combination of these two areas occurs, the funds will also be necessary on a larger scale."

This two-handed solution, with some variations, is upheld by many prominent figures in the sector. In reality, however, it usually clashes with an issue that has no short-term solution: the lack of a computer culture among most potential users. One clearcut example is the data banks of PRODASEN (Senate Data Processing) which, although they hold a sizable volume which is constantly updated, are accessed very little.

Computer Master Plan Discussed

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 pp 14-16

[Text] Planning data processing is not the same as planning computers. And this should be the basic philosophy of the companies' computer master plans, at least in the view of one of the most highly regarded and experienced computer consultants on the market, Luiz Carlos de Sa Carvalho, who participated directly in the process of creating CAPRE [Electronic Data Processing Coordination Committee] during the 1970's, and the devising of the Computer Master Plan.

PDI, which all government agencies must now submit periodically to SEI, was created in CAPRE about 1972, as one of its first activities. Then subordinate to SEPLAN [Secretariat of Planning], CAPRE was founded precisely as an agency to coordinate the purchase of equipment by state entities. PDI emerged as a kind of guidebook from which the enterprises attempted to purchase, completely directed toward the equipment per se. In addition, CAPRE included two more functions: support to the policy on human resources (an embryo that would become the national policy on computers), and a market survey, which would be conducted for the first time between 1973 and 1974.

In early 1976, certain government measures brought about a major shift in CAPRE's functions and in the PDI philosophy. This commission gained veto power, and any imports of equipment, even by private firms, had to be subject to it. The original guidebook started to be more elaborate, and soon, in addition to the configuration of the equipment (still the main objective), it began to devise questions of the "why" and "what for" type. SEPLAN imposed itself as a far stronger ministry, CAPRE gained more strength, and the institution of the computer consultant began to grow as well.

Luiz Carlos de Sa Carvalho started working at CAPRE upon his return from France, where he received a doctorate in computer science. Between 1973 and 1974, he served as a consultant for the agency in the human resources field; and, in 1976, directly in CAPRE's import control section. At present, he is an independent consultant heading his own company, SPL Computer (since 1978), and he recalls CAPRE's importance and the first efforts to create a PDI. He declares:

"CAPRE has done very serious work; it laid the groundwork for a professional environment in the area; it attached value to the national work of the Brazilian technicians; and it was certainly the embryo for the current national computer policy."

New Viewpoint

At present, all the state agencies are obliged to submit their master plans to SEI periodically, whether to purchase equipment, software, human resources, or training; in short, anything that involves expenses in the computer field. According to the Law on Computers, PDI must be approved by SEI. Ordinarily, the companies hire consultants through competitive bidding, to devise their master plan. Sa Carvalho thinks that, although the philosophy of the master plan has changed and evolved since the 1970's period, it has not yet attained the ideal.

He claims: "The stress now is still on the product, and not on the result of the information, the service, or doing things. In order to be solved, the computer problems require a new viewpoint, a change. Computer science is still greatly surrounded by legends, and myths; in the past, it was the myth of something very difficult; now, that of something very easy. Lies, in both instances."

In the specific instance of the PDI, Sa Carvalho maintains that the viewpoint of the consulting firm should be one of planning the management of information inside the company; there must be a questioning of the why of a piece of equipment, and not a mere collection of data concerning it.

The devising of a computer master plan takes approximately 6 months. This is a suitable period for carrying out all the necessary phases, because the planning must be done within a relatively short interval. The first of these phases consists of preparing the company model, that is, the representation, in a systematic manner, of its entire function, how it operates, as well as a survey of the equipment. However, the main thing is to learn the way in which the computer affects the company's activities, and to make an analysis of the resources.

According to Sa Carvalho, it is important for the company to mobilize for the process involved, as well. The openness of the company is one of the factors that will influence both the quality of the PDI and the time for devising the plan. It is unquestionably an expensive process, involving high-level people. The PDI professional is an expensive item, and his profile cannot be found very easily.

Integration

In the steps of the PDI, the next phase is that of systematic representation, and an explanation of the informational causes of the problems discovered (diagnostic phase). Next, it moves to a proposal for a new company, a new organization; the creation of an integrated, overall, subsystem, managing all the company's information.

Sa Carvalho stresses: "Making a PDI means planning the company's major information system, not necessarily a computer. The economic viewpoint and that of the system's role is essential to the success of the plan."

Among the problems hampering the ideal preparation of a PDI, Sa Carvalho cites the lack of performance standards in computers. "In the first place, because the manufacturers actually publish only the vital information on the equipment, mainly in connection with the fourth generation languages of the microcomputers. The problems also exists with the large-sized equipment, although to a lesser extent. There is no way of assessing the human performance and that of the machine, and attempting to do so requires a great deal of feeling on the part of the professional responsible for devising the plan."

One of the criticisms made of SEI's requirements concerning PDI relates to the excessive amounts of mere formalities to begin the notice of bidding competition per se, revealing a concern over thousands of bureaucratic requirements, "many of which are spurious." As Sa Carvalho observes, the formal part still carries more weight than the purposes themselves.

In fact, he emphasizes, the concern for a good master plan should be one for generating something palpable which, at worst, would be a goal to pursue, a horizon, a model in which the company will mirror itself for its progress.

[Box, p 14]

PDI, According to SEI

Regulatory Act No 15/81, of the Special Secretariat of Computers, which provides for the submission and monitoring of computer master plans, stipulates in Article 1 that all the organs and entities of the federal administration, direct or indirect, and the supervised foundations, must send to SEI, annually, by 30 September, the PDI or the respective updated version, with the following features:

- a. The original version of the PDI and the subsequent updatings must be multi-annual, covering the period of the year of execution and 2 more years of projection.
- b. The information on contracts for resources and services during the year of execution must be submitted with the largest number of items defining the activities to be carried out.

In addition to the policies and guidelines germane to the sector with which the organ, entity, or foundation is associated, the PDI must submit a series of objectives in the computer field which constitute criteria for the SEI analysis. The structure for preparing the PDI is divided into six parts. The first of these is introductory, and includes a managerial summary and the methodology for the preparation. The second part, relating to organization, includes: qualifications of the technicians responsible for the PDI; background, evolution, and tendencies of the organization; and policies, guidelines, objectives and goals related to computers, or having repercussions on them.

The third part depicts the current status of computers in the entity: background, evolution, tendencies, and organizational structure, systems in operation, and development. They must also list the main project or activity of the organization associated with each system.

The fourth part deals with the planning base; and the fifth, with the situation planned in the computer field, also containing justification for the equipment planned. Finally, the sixth part calls for a description of the systems to be adopted by the organization in monitoring the execution of the PDI.

[Box, p 16]

Ahead of the Legislation

Generally speaking, the state enterprises have a similar procedure in dealing with the PDI. Many of them, primarily those of large size, had already made their master plans even before the requirements in the Law on Computers.

A typical case is that of the National Economic and Social Development Bank (BNDES) which has a tradition of planning before the legal formalities. The first plan of BNDES (known as a Systems Plan) was devised in 1973 by a foreign consulting firm, with the participation of employees from the then Systems Department.

During that period, as the department chief, Ricardo Augusto de Farias relates, the bank underwent a major revision, being converted from an autonomous entity to a public enterprise. The computer activity was marked by difficulties, and by the introduction of a technology that was still little known and little accepted; and the systems developed were definitely financial-administrative.

The next year, impacted by the deepseated changes in its structure, BNDES prepared a new plan for the computer area. It was called the Long-Term Systems Plan, which reached a target date of 5 years. In early 1979, BNDES created its Systems Committee, comprised of representatives from all the areas and subsidiaries, with the authority to devise a new systems plan; which occurred in the middle of that year. The Systems Master Plan, revised in June 1981, established the basic guidelines for the development and implementation of systems in BNDES.

Since 1981, as a result of Regulatory Act No 15 of SEI, which made the submission of the Computer Master Plan by all organs of the federal administration compulsory, BNDES has been submitting its PDI in the stipulated manner.

The PDI covers a 3-year period, with details for the first year. The chief of the BNDES Systems Department explains that it takes approximately 3 months to prepare the plan, and cites some difficulties in the SEI formats, which are rather complex in some instances, containing certain unnecessary requirements.

Ricardo de Faris also explains that the fact that BNDES has anticipated the SEI requirements is associated with the bank's own planning tradition.

ABICOMP Director Reports

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 pp 17-19

[Article by Arthur Pereira Nunes, executive director of ABICOMP (Brazilian Association of the Computer Industry), who was SEI services undersecretary, and a former official of CAPRE]

[Text] It is often claimed that the public sector accounts for 60 percent of the Brazilian computer market. Although this participation may be real for specific segments of products, it is not observed for the computer sector as a whole. The careful reader will already have noted that even government authorities cite the state as responsible for 60 percent of the Brazilian computer market. It is a myth that has spread rapidly, prompting fundamental errors in evaluation.

We shall attempt to size the public sector's participation based on currently available official data. It seems essential to us to understand the scope of that participation, so as to be able to discuss its significance and the role incumbent on the public sector at a time when the country is going to prepare a new Constitution.

The public sector's participation in the Brazilian computer market should not be very far removed from the 30 percent mark. We are interpreting the public sector based on its broadest definition, including organs of direct and indirect administration, and public enterprises in the federal, state, and municipal areas.

We shall attempt to present data relating on the public sector's participation that will make it possible to analyze the relative weight of that sector, based on criteria of: value of the installed computer equipment, spending on data processing, numbers of professional employees, imports volume, and sales volume of the national computer and peripherals industry. The compilation of data available in various publications issued by SEI during recent years makes it possible to devise the following comparative table of the public sector's participation in the Brazilian market (see Table i).

The assessment of the market based on the value of the installed equipment is one of the traditional ways of measuring the performance of that sector. Although equipment with very different values and sizes is involved, this measurement provides us with useful indications.

The available data point in the direction of a federal public sector participation of about 15 percent of the Brazilian equipment. We estimate that, if the values of the volumes of equipment in the state area (9 percent) and the municipal area (1 percent) are combined, this participation stands at no more than 25 percent of the Brazilian computer equipment.

The spending on data processing includes cost and investment expenses, for example, payment of salaries, leasing and maintenance of equipment, contracting

services of third parties, purchases of equipment, physical installations, and purchases of software.

During the first half of the 1980's, the spending on computers accounted for between 1.5 and 2 percent of the Brazilian GDP. Similar studies made for the 1970's indicate a participation of about 1 to 1.5 percent of the GDP in the spending.

Based on that criterion for assessment, the public sector accounts for 27 percent of the Brazilian market. Estimates made by SEI in 1986 indicate that the federal government's spending on computers represents 0.9 percent of its budget; in other words, less than 1 percent of the government revenue is appropriated for the computer sector.

Data Processing Personnel

Another way of gauging the public sector's participation in the Brazilian market is by comparing all the professionals employed in the government and the private sector. The salary spending accounts for nearly 60 percent of the CPD expenses. Thus, the number of professionals carries important weight in the assessment of the market; and not only because of the amount of the salaries, but also because of the potential demand for goods and services that those professionals generate.

The federal government, with 27.9 percent of the computer labor, employs nearly 60,000 professionals, nearly half of that contingent being composed of digital operators. We estimate that, if we were to combine these professionals in the state and municipal computer areas, we would arrive at a participation of approximately 30 percent of the personnel in the public area.

Another equally enlightening criterion is the value of the imports made by the public sector. According to the data on imports authorized by SEI, during the period 1983-85, the country imported over \$1.6 billion dollars' worth. In the first and last year of that series, the public sector participated, with 30 percent of the imports. In 1984, the participation was even less, amounting to 20 percent of the authorized imports. The imports in the areas of process control and digital instrumentation are the ones showing the greatest relative weight in the public sector. In those two instances, the public area's participation stands at 50 percent.

When we consider the public sector's participation in the national computer and peripherals industry market, we note that 24.8 percent of the national industry's sales are made to government agencies, including therein public financial institutions (11.7 percent) and organs of direct administration (13.1 percent). The national industry's sales to the industrial sector, significant since 1980, stand at between 26 and 29 percent of the total. In this sector we also find public participation that could increase that sector's participation slightly, without, however, making substantial changes in the totals noted; because the weight carried by the public area in this definitely private segment of activity is small.

Decentralization

The expansion of the computer sector in the country, and in the public area in particular, occurred precisely during the process of politico-administrative centralization, carried out during the post-64 authoritarian regime. This obviously does not mean that computers are responsible for the maintenance of the dictatorship; but there is no denying that they brought some surpluses.

During the same period in which the state activity increased considerably, in the course of the authoritarian process, we observed the emergence and expansion of the doctrine of centralized processing. and the large CPD, centralizing the activities in the enterprises. During the euphoria of the "miracle," computer imports expanded considerably.

The technical base available then was that of centralized processing, the large CPD, and batch processing. A substantial part of that process was supported by increasing and often excessive imports.

During that period, the term "piracy" had a different meaning. It was the escape of trained professionals from one company to another which had just contracted for a computer and needed people to keep it in operation. Moreover, at that time we also coexisted with another type of piracy: the escape of researchers and intellectuals to the more developed centers, in search of working conditions (and research) worthy of the scientific training that they had acquired in courses for the master's and doctoral degrees. In other instances, the reason was the political persecution enacted against the intellectuals who did not cooperate with the dictatorship.

Let justice be done. In many companies, computer users and suppliers, we shall find examples of dignity and courage among managers who did not allow themselves to be led by the wave of political persecution, and who resisted. And the lack of skilled labor justified many defenses of fellow workers.

At the time, the important thing is to understand that, with the dissemination of teleprocessing techniques and the new computer resources gradually placed at the user's disposal, the debate began over the decentralization of data processing. Centralized versus decentralized processing, the use of minis, terminals, etc., were debated at the same time that the process of centralizing and concentrating the political power in Brazilian society remained untouched.

Decentralization was more of a utopia than a real process under way. The available technical base allowed for some progress; but, at the same time, the saying "information is power" gained more adherents, particularly among those who enjoyed the benefits of the technical-political centralization. In fact, on the operational level of the agencies, there occurred a "decentralization" of the CPD, with the transfer of some data entry activities to the user.

I procured one example of the results of that process in a study that I made based on data from 1981. The 100 largest computer user firms were responsible, that year, for 50 percent of the value of the installed computer equipment,

in a sample of 2,500 business firms surveyed. The 100 largest had, as a minimum, one class 6 computer (\$3 million), or two class 5 computers (\$1.9 million apiece).

The 50 largest companies accounted for 38 percent of the value of the installed equipment. Of the 50 largest, 25 were in the public sector, and 25 in the private sector. The list of the largest firms and the respective sector and main area of activity is shown in Table 3.

The process of decentralizing data processing activities may be accelerated during the coming years. Certain prerequisites exist. Unlike the centralizing process of the recent past, decentralization is a demand from the society. While the politico-administrative centralization process was supported by an available data processing technology which also prompted centralization, the need for decentralization is occurring at a time when the data processing technologies are also heading in the direction of distributed processing.

There are mere coincidences. The political decentralization may be backed by a nationally dominated technical base, without pressure on the balance of payments. There is technical competition and an industrial base for making it viable in present-day Brazilian society. The expansion of telecommunications resources, and dissemination of minis, micros, supermicor-computers, networks, etc., are concrete examples of some of the available instruments.

The growing pressure for a thorough tax reform, with an increase in the state and municipal governments' share in the use of the funds collected through taxes, is added to the pressure that the citizens are increasingly bringing to bear on the quality of the treatment received from public services as a whole. The need for democratization of information pervades the entire Brazilian society. Although the public sector has greater sensitivity, that process could also reach the private sector in different ways.

It will become increasingly essential to provide information where the decision is made. The more intensive the democratization process is, the greater will be the need for politico-administrative decentralization, and the greater, also, will be the importance of distributed processing, and hence of greater "intelligence" at the top of the systems.

Does this mean that the large systems are doomed? They will certainly have to be reconsidered. It is still very difficult to gear managerial styles, and computer technicians and resources to those new times that are gradually being delineated.

When we note the potentiality of the decentralization process, we cannot fail to consider, among specific factors, the computer sector which could influence the intensity of that trend. On the one hand, those factors would be the orientation of PLANIN [Industrial Plan] calling for the adoption of distributed processing (chapter on "Use of Computers"), and the expansion of the computer equipment with over 250,000 installed units and nearly 300 producing firms.

On the other hand, we have the multinational firms which, owing to the computer policy, are concentrating on large-sized equipment. The type of coordination or competition between those important segments of the industry, and even within each segment, may indicate the limitations and possibilities for adopting distributed processing on a large scale in our country.

Another essential factor is the training of human resources. There are several courses which give priority to training professionals, with emphasis on the distributed processing techniques. If they succeed, the groundwork will be laid for the consistent progress of that trend, which will not be confined to the public sector.

Table 1:

Public Sector's Participation in the Brazilian Market Based on Different Criteria

Criterion	% of Public Sector Participation
Value of installed equipment	25%
Data processing expenses	27%
Data processing personnel	28.9%
Imports	30%
National computer industry sales	24.8%

Source: SEI - Informational Bulletins, Panorama of the National Industry, Computer Profile in Public Administration

Table 2:

Imports of Computers and Peripherals, 1969-1985

Year	Millions
1969	13.3
1970	27.1
1971	46.4
1972	56.9
1973	78.5
1974	98.8
1975	112.0
1976	118.0
1977	100.0
1978	130.0
1979	153.3
1980	164.7
1981	182.4
1982	194.4
1983	152.5
1984	148.7
1985	195.0

Table 3:

List of the 50 Largest Computer Users in 1981, Based on the Criterion of Value of Installed Computer Equipment

Position	Entity	Sector	Activity
1.	Bradesco	private	financial
2.	Itau	private	financial
3.	Bank of Brazil	federal public	financial
4.	Sepro	federal public	service bureau
5.	Prodesp	state public	service bureau
6.	Cpdct-Curitiba cpd	municipal public	service bureau
7.	Petrobras	federal public	industrial
8.	Banespa	state public	financial
9.	Unibanco	private	financial
10.	Usp	state public	educational/research
11.	Procesa	private	service bureau
11.	Probam/Mg	state public	financial
12.	Volkswagen	private	automobile
12.	Procergs	state public	service bureau
13.	C. E. Walmap	private	financial
14.	Banco Economico	private	financial
14.	Cetil	private	service bureau
15.	Prodasc	state public	service bureau
15.	Montedata	private	service bureau
16.	Banrisul	state public	financial
16.	Banerj	state public	financial
17.	Telesp	state public	financial
17.	Vasp	state public	air transport
17.	Varig	private	air transport
18.	Proderj	state public	service bureau
19.	Incremento Inf.	private	service bureau
20.	Comind	private	financial
20.	Ind. Cushsinger	private	industrial
21.	Philips	private	industrial
21.	Gm do Brasil	private	industrial
21.	Finasa	private	financial
22.	Banorte	private	financial
22.	Pao de Acucar	private	commercial
23.	Vale do Rio Doce	federal public	mineral extraction
23.	Prodemge	state public	service bureau
23.	Banco Safra	private	financial
24.	Banco Noroeste	private	financial
24.	Atlantica Seg.	private	insurance
24.	Prodam	state public	service bureau
25.	Transbrasil	private	air transport
25.	S.P. Fed. Tech. Sch.	federal public	education/research

[continued]

Position	Entity	Sector	Activity
25.	Ufmg	federal public	education/research
26.	Usiminas	federal public	iron and steel
26.	Cetepe	state public	service bureau
26.	Rhodia	private	industry
27.	Telerj	federal public	telecommunications
27.	Eletrodados	private	service bureau
27.	Ipen	federal public	education/research
28.	Bco-Servel	private	service bureau
28.	Fumas	federal public	industrial

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CSO: 3699/68

COMPUTER ASSOCIATIONS CONFEDERATION FEEDS PROTECTIONISM

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 pp 24-25

[Text] This week, the Brazil Computer Movement is due to submit to the Constituent Assembly's science, technology, and communication subcommission its manifesto and proposal for a legal system for the country's technological development. The document, which DATA NEWS is publishing on an exclusive basis, shows a deep concern over the national sovereignty, putting the social aspects and citizens' rights ahead of the progress of informational technology. For example, it defends incentives for "genuinely national business," that is, the kind actually controlled by residents of the country. It proposed guarantees for the citizen's privacy and the worker's protection, such as the recycling of labor threatened by computer conversion, and also profit-sharing, and reduction of the work day. According to the MBI document, it is incumbent on the state to discipline and establish priorities for the strategic sectors which propagate technology; with computers included among them, of course, because "it is not a sector in itself, but rather a technology permeating all the economic sectors essentially." This is the complete text of the document:

At a time when the National Constituent Assembly is beginning its work to prepare the new Constitution of Brazil, during which major national issues will be debated, including our model of development, whereas:

1. Scientific and technological development must be in the service of the society as a whole, contributing to the promotion of economic, social, and cultural advancement, and to the elimination of social inequalities and injustice;
2. Scientific and technological development must be integrated into the nation's economic, social, and cultural process;
3. The present international economic order, based on concepts of a "free market," the "international devision of labor," and hegemonic powers, is hampering the development of the underdeveloped nations;
4. It is undeniable that the mastery of leading technologies is the dividing line between the sovereign countries and the dependent countries;

5. The importance of technology in the modern world is acknowledged by everyone, to the extent of prompting the advanced countries to apply increasingly greater pressure for opening the markets of all other countries to their high technology products and services and to their investments in those sectors;
6. A model of development giving priority to exports of products and services which use cheap labor intensively is being made impractical by the technological progress of the modern world;
7. The scientific and technological assets of a society consist of the combined knowledge and skills of its people, enabling them to solve their problems and to address their needs;
8. Technology is developed by practice, in the act of doing, and is not a commodity that can be purchased;
9. Technological information is only being transferred by those who have it to those who already have it, and never to those who do not have it;
10. Any policy for scientific and technological development requires:
 - a. An integrated program for training human resources on various levels, from intermediate-level technicians to doctors in post-graduate programs;
 - b. A scientific research program compatible with the intentions of the technological development plan;
11. In the technological development process, the genuinely national industry should be stimulated to absorb qualified human resources and to develop technology, with the universities responsible for conducting scientific research and creating the necessary prospects, becoming a fitting environment for training those human resources;
12. Genuinely national enterprise is interpreted as being that whose control of managerial and technological capital is actually exercised by residents of the country, thus excluding from this notion the "joint ventures" which are technologically controlled by the foreign partner;
13. In the context of a world economy that is intensely internationalized, wherein the multinational firms have undeniable advantages based on their global scale of activity, the genuinely national enterprises will only be willing to invest in technological development if they have political measures to count on that will ensure them a competitive status;
14. Common to all the mechanisms giving an incentive to technological development there is the domestic market, because it is a fundamental resource of the nation, and the domestic market should be the principal means for fostering the development of the national technology in any sector, hence its social function should be defined sectorially;

15. It is necessary to acknowledge the presence of differences among the various sectors wherein the effort for technological development is required, and, therefore, different mechanisms must be adopted that will make possible the process of creating technological experience in accordance with each sector;
16. The state, therefore, must act in a disciplining manner, giving priority to the strategic sectors and groups spreading technology, for example, the computer sector. Computers are not a sector per se, but rather a technology which permeates, essentially, all the other economic sectors, for example, the capital equipment sector, the transmission line for new electronic-based technologies to the productive system as a whole;
17. The introduction of modern automation processes must be reconciled with the need to create and improve jobs, ensuring work of the following rights:
 - a. The recycling and reutilization of labor possibly released in the automation process;
 - b. Participation in the decision on the automation process in business firms and public agencies;
 - c. Sharing in the benefits of technical progress, profit-sharing, and a reduction in the work day;
 - d. Introduction of technologies aimed at eliminating or reducing to a minimum the unhealthy conditions in work places;
18. In the context of a modern, computerized society, Brazil cannot do without suitable means for protecting the individual rights of the citizen; particularly in the defense of privacy, there should be means that will allow:
 - a. Citizens' access to the records in public or private data banks containing information regarding them;
 - b. Requiring respect for the citizens' right to change such information when it is false or inaccurate;
19. Technological autonomy implies a capacity to decide at any time on the technology that best suits the country, not to be confused with technological isolationism;
20. Development implies social, economic, and cultural progress, benefiting all strata of the population, and including the capacity to decide and plan, not to be confused with a mere economic modernization;
21. Any model of development aimed at meeting the real national requirements demands the necessary sovereignty, this being interpreted as the nation's capacity to devise its own future in accordance with the internal forces;

22. A country which wants to be sovereign must create the necessary conditions for technological development, and for this purpose it must promote this process, taking into consideration the inhibiting action of foreign countries and enterprises;

23. Only a capable people can be a sovereign people.

The signatory entities, belonging to the Brazil Computer Movement, which is striving for a sovereign Brazilian development, make these claims.

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CSO: 3699/67

ENGESA, IBM ARRANGE \$100 MILLION DEAL**Sao Paulo GAZETA MERCANTIL in English 20 Apr 87 p 6****[Text]**

Engesa S.A., a leading arms manufacturer, has signed a \$100 million contract to supply switching modules for personal computers to International Business Machines Corp. of Armonk, New York, over the next five years.

The modules will be manufactured by Engetrônica S.A., an Engesa subsidiary created four years ago to make optical and electronic equipment for Engesa's armored vehicles. "The IBM deal is the largest non-military contract signed by Engetrônica," says the subsidiary's public relations director, Miguel Whitaker França Pinto. Engetrônica beat out competitors for the contract from several countries.

Negotiations between IBM of the U.S. and Engetrônica were intermediated by IBM's Brazilian subsidiary. The contract, which is only for the U.S. market, calls for shipment of the modules to begin next month.

The deal is the first ever signed between IBM and Engesa, and is part of

the computer giant's strategy to seek Brazilian suppliers, says Pinto. An IBM do Brasil spokesman adds that no other Brazilian company manufactures switching modules of the type required by IBM.

Engetrônica won't have to invest anything to fill the order, says Pinto, since the company already has the equipment to manufacture the modules.

Meanwhile, IBM do Brasil reports that last year it made a profit of Cz\$ 2.04 billion (\$149.8 million at the average 1986 exchange rate) on sales of Cz\$ 11.28 billion (\$828.2 million). Sales were up 3% in dollar terms from 1985.

This is the first time IBM do Brasil has publicly released information about its sales and profits in the 70 years the company has been active in Brazil.

IBM accounted for 28% of the computer industry's total sales last year, estimated at \$3 billion.

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CSO: 3699/69

RECESSION EXPECTED TO IMPACT ON BRAZILIAN S & T INVESTMENTS

Rio de Janeiro DATA NEWS in Portuguese 27 Apr 87 p 20

[Text] ABAC [Brazilian Association of Commercial Automation] is still encouraging the bar code, but commerce is more interested in cheap solutions for operations. Until there is a solution for the economic policy, businessmen will remain in a holding pattern, awaiting the acceleration of sales.

Moderation in investments: that is the prescription that the Brazilian Association of Commercial Automation will suggest to the industry and retail trade, to prevent the shock of the economic recession. Scanners, optical readers, and laser scanners will be left shelved on a secondary level, awaiting some economic decision, while a search is made for a standardization of the documents flowing between commerce and industry. Antonio Galvao Vasconcelos, head of ABAC, maintains: "We want a standard for fiscal memoranda and other documents, in accordance with the national products code."

That code is not the bar one which, according to Galvao, will continue to be encouraged by ABAC. After all, there are over 3,000 products marked with the bars (codification Ean 13), by companies such as Nestle, Sanbra, and others. On 4 May, ABAC, retailers, industries, and representatives from the Ministry of Industry and Commerce are due to discuss this new phase of "moderation."

He made the comment: "We shall attempt to imitate the example of countries such as Spain, France, and Great Britain, which have adopted a common language in their purchase orders." Today, there is a veritable translation between the purchase orders of the retailer and the industry, because each one has its own standard. The pressure for standardization is founded upon the importance of cutting operational costs in commerce and industry. The commercial automation user is also beset with the difficulties stemming from the arrival of products with different codes, claims the ABAC head.

Without a Scanner

It will be a marking time situation until it is decided what to do in terms of an economic policy. How long will it last? "Ask Funaro," remarks Galvao sarcastically. At any rate, he says that only Mappin and the Real Supermarkets (Rs) are maintaining the plans to install automation, with the import orders associated with the Special Secretariat of Computers (SEI).

According to Galvao, many business firms which had been quite interested in adopting that process were discouraged by the beginning of the recession and high interest rates. This is another setback added to those that ABAC has been accumulating. When this segment of automation began to be discussed in late 1983, the topic of the day was the presidential succession. Later came the death of the president-elect, the Cruzado Plan (with the demand forcing greater concern for replacing commodities), and now, the recession.

So, the rate of automation installation in commerce has not been encouraging. There is some good news, such as Estrela's decision, reported to the head of ABAC, to sponsor a campaign together with its resellers, explaining the benefits of the use of the bar code, a kind of prerequisite for commercial automation.

With that option (or solution) to forget, somewhat, the more sophisticated automation equipment for the retail trade, and to consider cheap alternatives, commercial automation in Brazil is still only attesting to the fluctuations in the economy, and the euphoria associated with recession. With the decline in purchasing power intensified by the voracity of the "Lion" (which is already dreaming of more indirect taxes), spurred on by the very high interest rates, commerce will have to consider even more economical suggestions for automation.

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BRAZIL TO ALLOCATE MORE FUNDS FOR S & T SCHOLARSHIPS

Brasilia AGENDA CNPq in Portuguese Mar 87 p 5

[Text] The Program to Train Human Resources for Science and Technology, initiated on 10 February by President Sarney, calls for an increase of over 400 percent in the number of study grants for master's degrees, doctorates, and post-doctorate courses abroad by 1989. An increase of about 300 percent has been planned for grants inside the country. This means that, at the conclusion of the plan, in 1989, the grants abroad will total 10,000, while those in the country will amount to 33,000.

In his speech during the ceremony to initiate the program, President Jose Sarney said that the mastery of technology "is imperative for development," and "the future will not belong to large or small countries, but rather to those which have mastered technology." The minister of science and technology, Renato Archer, justified the opening of the program, claiming that, "The path to national sovereignty entails the country's scientific and technological training, which requires an accelerated program to train specialists."

The program will also promote the gradual correction of the amounts of the grants, moving from 60 percent of the salary of an instructor who works 40 hours a week to 70 percent of the salary of an instructor under an exclusive engagement system. In addition, there will be an automatic readjustment of the amount of the grants, which will keep pace with the salaries paid by the local universities. The program also stipulates, within 2 years, the setting of the master's degree grant at 80 percent of the reference salary of auxiliary professors, and, for the doctorate at 80 percent of the salary of assistant professors (see Table 1).

The number of grants for the master's degree, doctorate, and post-doctoral course at CNPq [National Council for Scientific and Technological Development] and the Coordinating Agency for Advanced Training of Higher-Level Personnel (CAPES) abroad will increase to 6,000 this year, as compared with 2,177 in 1986. The grants within the country will increase from 10,613 in 1986 to 17,000 in 1987. A supply of 8,000 grants abroad and 24,000 in the country has been planned for next year; and in 1989 those figures should reach 10,000 and 33,000, respectively (see Table 2).

The fields of computer science, biotechnology, new materials, precision mechanics, and pure chemistry, considered strategic by the present government, will receive sizable amounts, and increases in the new grants offered: 35 percent of the total in 1987, 50 percent in 1988, and 52 percent in 1989. When combined, these fields will have at their disposal 10,000 grants in the country and nearly 5,000 abroad.

Table 1

Grants in the Country
(reference level January/87)

Introduction to science	1,900.00 cruzados
Advanced training	3,800.00 curzados
Master's degree	5,800.00 cruzados
Doctorate	8,000.00 cruzados
Post-doctoral training	13,300.00 cruzados
Technical support *	4,620.00 cruzados

* Average amount

Table 2

Study Grants in Strategic Fields
(targets for the period 1987-89)

	1987		1988		1989	
	C	A	C	A	C	A
Biotechnology	950	600	1,550	950	2,150	1,150
Computer science	950	600	1,330	950	2,150	1,150
New materials	1,150	350	2,100	750	2,850	1,100
Precision mechanics	300	100	600	300	1,000	600
Pure chemistry	650	350	1,200	550	1,850	800
Subtotal:	4,000	2,000	7,000	3,500	10,000	4,800
Other fields	13,000	4,000	17,000	4,500	23,000	5,200

C = in the country

A = abroad

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CSO: 3699/67

BRAZIL'S ENGEZA, AEROSPATIALE TO BUILD HELICOPTERS

Sao Paulo GAZETA MERCANTIL in English 27 Apr 87 p 7

[Text]

Engesa, a leading arms manufacturer, has acquired a 31% stake in Helibrás, the troubled helicopter joint venture between France's Aérospatiale S.A. and the Minas Gerais state government. Engesa plans to boost its share to 60% and supplant the state government's control, says Engesa president José Luiz Whitaker Ribeiro.

Since Helibrás's foundation in March 1980, Minas Gerais has held 55% of the company, based in Itajubá, and Aérospatiale has held 45%. Virtually all of the technology and components are supplied by Aérospatiale for the Brazilian versions of its lightweight Lama and Ecureuil models, designated Gavião and Esquilo, respectively.

Engesa's entry was part of an accord whereby Aérospatiale converted into equity the equivalent of \$19.3 million of debt owed by Helibrás to the French company. Aérospatiale gave Engesa a 31% stake as payment for some services, and kept 49% of the joint venture. With the increase in capital, the share held by Minas Gerais has shrunk to 20%.

The company has failed to live up to ambitious expectations, for after seven years of operation only a tenth of the components are made in Brazil and Helibrás's models reportedly cost a third more than the equivalent made in France.

Ribeiro wants to expand local content to 60% and begin manufacturing a copy of Aérospatiale's top-of-the-line Super Puma, capable of carrying over four metric tons or 21 fully-equipped soldiers. He also wants to turn Helibrás into an important exporter of helicopters.

The success of these plans depends largely on the size of government orders for everything from military transport to oil exploration. A rush of orders would give Helibrás the economy of scale it desperately needs.

"There was a plan in Brasília to buy 500 helicopters, but all we can be sure of is the Army's intention to acquire 16 units," says Ribeiro.

Now that Engesa, one of Brazil's most successful companies and reportedly the world's leading manufacturer of armored cars, has bought into the country's only helicopter maker, Aérospatiale can boast a strong partner in its competition against other foreign helicopter majors seeking to break into the Brazilian market.

West Germany's Messerschmitt-Bolkow-Blohm and West German-owned Ferrostaal do Brasil had submitted proposals to Brasília in August to set up a company to replace Helibrás. Italy's Agusta group has expressed interest in joining forces with Embraer, the aircraft maker, and Sikorsky and Bell of the U.S. are also trying to get in.

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CSO, 3699/69

SOVIET FINANCING FOR BRAZILIAN FERROALLOY PLANT

Sao Paulo GAZETA MERCANTIL in English 4 May 87 p 5

[Text]

Moscow Narodny Bank of the Soviet Union will lend \$10 million more than originally agreed to help in the construction of Provale, a project to build Brazil's largest ferroalloy plant, say sources at federally-owned Companhia Vale do Rio Doce (CVRD) (report in April 6 issue).

The announcement that the Soviet Union will raise its funding to \$60 million, out of the total \$100 million investment needed, comes as a team of Russian mining, construction and electricity experts makes its visit to the future site of the plant at Parauapeba, near Marabá, in the Northern state of Pará.

Provale is a joint venture 60% owned by Prometal, a specialty steels manufacturer, and 40% by CVRD. In return for the Soviet loan, Provale has agreed to sell half its projected output of 150,000 metric tons a year of ferroalloys to the Soviet Union.

The Russian mission will sign a

final protocol agreement formally authorizing the creation of Provale with the Brazilian partners this Friday, says CVRD. In July, there will be a final meeting to decide on the transfer of Russian technology to the plant, the company says.

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BRIEFS

BRAZILIAN-SOVIET COOPERATION--Starting this year, Brazilian institutions such as the National Institute of Space Research (INPE), the National Institute of Meteorology (INEMET), and the National Observatory (ON) will engage in a series of activities jointly with the leading Soviet centers in the fields of space science and meteorology. The talks on the intensification of scientific cooperation between Brazil and the USSR began in November of last year, upon the visit to Moscow by the science and technology minister, Renato Archer, and the head of CNPq [National Council for Scientific and Technological Development], Crodowaldo Pavan. Between 26 January and 5 February, a mission comprised of representatives from INPE, INEMET, and ON visited USSR research centers, including the Academy of Science Space Research Institute, the State Committee on Hydrometeorology and Environment, the Izmiran Institute, and Glavscosmos. The agreements reached by the Brazilian mission and the USSR representatives resulted in the identification of scientific cooperation in several fields: INPE's participation in the Fobos (Mars moon) project, through the Itapetinga Radio Observatory (Atibaia, Sao Paulo), and in the mission to the planet Mars in 1992; joint studies of cosmic sources of X and gamma rays, made at the MIR Orbital Station, with simultaneous observations in Brazil; studies of the terrestrial ionosphere, magnetosphere, and space plasma, through joint experiments with Soviet satellites and Brazilian instruments, such as stratospheric balloons, rockets, probes, and measurements from the ground, with emphasis on studies of the South Atlantic magnetic anomaly with the equatorial electrojet. It was also decided that INPE and INEMET would soon submit proposals for cooperation on ozone studies by making instrumentation compatible and exchanging information, with studies of "El Nino," agrometeorology, and research on crystal growth in microgravity, setting up Brazilian experiments at the Soviet MIR station. INPE invited the Brazilian scientific community to participate in a program unprecedented in the country, for the design and construction of scientific satellites. The satellites could be used basically for three types of scientific missions, including studies of space geophysics, astrophysics, and the solar system. In this connection, a notice was published concerning opportunities open to the entire Brazilian scientific community, requesting that detailed proposals be sent for scientific experiments which could be conducted aboard artificial satellites built in Brazil. The proposals will be received by INPE's Scientific Satellites Commission until 31 March. [Text] [Brasilia AGENDA CNPq in Portuguese Mar 87 p 5] 2909

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